

# *appendix C: solar radiation at various locations and latitudes*

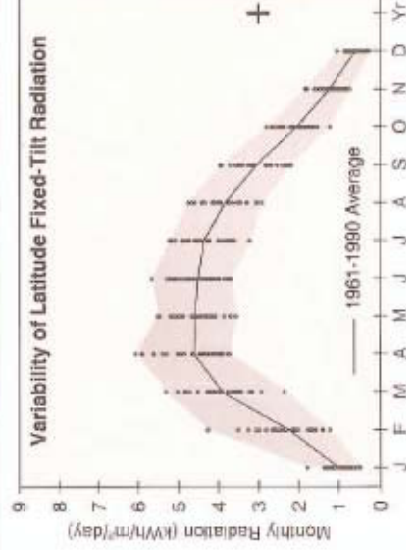
These charts contain data needed for the sizing calculations used for solar energy systems. These data are in metric units ( $\text{kWh}/\text{m}^2/\text{day}$ ) and are especially useful for estimating the performance of photovoltaic systems. All data in these charts are from the U.S. Dept. of Energy, National Renewable Energy Laboratory, and is also available at their website: [www.nrel.gov](http://www.nrel.gov) To use English units, see the data in Appendix A.

# Anchorage, AK

WBAN NO. 26451

LATITUDE: 61.17° N  
LONGITUDE: 150.02° W  
ELEVATION: 35 meters  
MEAN PRESSURE: 1004 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	0.3	1.0	2.3	3.6	4.6	4.9	4.6	3.5	2.2	1.1	0.4	0.2
	Min/Max	0.2/0.4	0.7/1.3	1.7/2.6	3.2/4.5	3.8/5.3	4.1/6.0	3.7/5.4	2.9/4.2	1.9/2.6	0.9/1.4	0.3/0.5	0.1/0.2
	Average	0.9	2.1	3.8	4.7	4.9	4.5	4.8	4.1	3.1	2.0	1.1	0.5
Latitude -15	Min/Max	0.4/1.6	1.2/3.8	2.3/5.0	3.9/6.1	3.9/5.9	4.1/6.2	3.8/5.7	3.1/5.0	2.3/3.9	1.2/2.7	0.7/1.6	0.3/0.9
	Average	1.0	2.2	3.9	4.6	4.6	4.5	4.4	3.8	3.1	2.1	1.2	0.6
	Min/Max	0.5/1.8	1.2/4.3	2.4/5.3	3.7/6.1	3.6/5.5	3.7/5.7	3.2/5.2	2.9/4.8	2.2/4.0	1.2/2.8	0.7/1.8	0.3/1.0
Latitude +15	Average	1.0	2.3	3.9	4.3	4.0	3.9	3.8	3.4	2.9	2.0	1.3	0.6
	Min/Max	0.5/1.9	1.2/4.5	2.3/5.3	3.4/5.8	3.1/4.8	3.2/4.9	2.8/4.5	2.6/4.3	2.0/3.8	1.2/2.8	0.7/1.9	0.3/1.1
	Average	1.0	2.3	3.7	3.3	3.2	3.2	3.1	2.9	2.6	1.9	1.3	0.6
90	Min/Max	0.5/1.9	1.2/4.4	2.2/5.1	3.0/5.3	2.6/4.0	2.6/4.0	2.3/3.7	2.2/3.6	1.8/3.4	1.1/2.6	0.7/1.9	0.3/1.1
	Average	0.5/1.9	1.2/4.4	2.2/5.1	3.0/5.3	2.6/4.0	2.6/4.0	2.3/3.7	2.2/3.6	1.8/3.4	1.1/2.6	0.7/1.9	0.3/1.1
	Min/Max	0.5/1.9	1.2/4.4	2.2/5.1	3.0/5.3	2.6/4.0	2.6/4.0	2.3/3.7	2.2/3.6	1.8/3.4	1.1/2.6	0.7/1.9	0.3/1.1

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year	
0	Average Min/Max	0.5 0.3/0.8	1.5 0.9/2.8	3.5 2.1/4.7	5.2 4.1/6.9	6.1 4.6/7.6	6.3 4.7/8.4	6.0 4.3/7.5	4.7 3.4/5.9	3.1 2.2/3.9	1.6 1.0/2.2	0.7 0.5/0.9	0.3 0.1/0.4	3.3 2.9/3.6
Latitude -15	Average Min/Max	0.9 0.5/1.7	2.4 1.3/4.6	4.0 2.6/5.5	6.1 4.8/8.3	6.6 4.8/8.3	6.6 4.8/8.9	6.3 4.3/8.0	5.2 3.6/6.7	3.8 2.5/4.9	2.2 1.3/3.2	1.2 0.7/1.8	0.5 0.3/0.9	3.9 3.4/4.2
Latitude	Average Min/Max	1.0 0.5/1.9	2.5 1.3/5.0	4.8 2.7/6.7	6.1 4.7/8.3	6.4 4.7/8.1	6.3 4.6/8.6	6.1 4.1/7.7	5.1 3.5/6.6	3.8 2.5/5.0	2.3 1.3/3.3	1.3 0.8/2.0	0.6 0.3/1.1	3.9 3.4/4.2
Latitude +15	Average Min/Max	1.1 0.5/2.0	2.6 1.3/5.1	4.7 2.6/6.7	5.8 4.5/8.1	6.0 4.3/7.6	5.9 4.2/8.1	5.7 3.8/7.3	4.8 3.3/6.2	3.6 2.4/4.8	2.3 1.3/3.3	1.4 0.8/2.1	0.6 0.3/1.2	3.7 3.3/4.1

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	1.1	2.6	4.8	6.1	6.7	6.8	6.5	5.2	3.8	2.4	1.4	0.7
	Min/Max	0.5/2.1	1.3/5.1	2.7/6.7	4.8/8.3	5.0/8.4	5.0/9.2	4.5/8.2	3.7/6.8	2.6/5.0	1.3/3.3	0.8/2.1	0.3/1.2
													3.6/4.4

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 8\%$

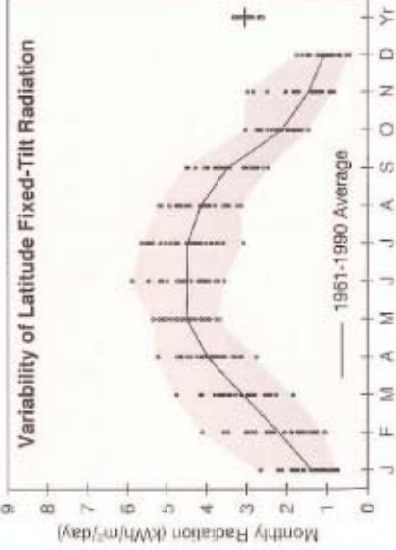
Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average Min/Max	0.6 0.2/1.5	1.3 0.4/3.4	2.2 0.8/3.7	2.6 1.5/4.3	2.8 1.6/4.5	2.8 1.6/4.5	2.6 1.2/3.8	2.1 1.2/3.2	1.7 0.9/2.6	0.8 0.3/1.4	0.4 0.1/0.8	1.8 1.5/2.0
1-Axis, N-S Horiz Axis	Average Min/Max	0.2 0.1/0.5	0.8 0.2/2.0	1.9 0.6/3.3	3.0 1.7/4.9	3.5 2.0/5.0	3.4 1.8/5.5	3.3 1.5/4.8	2.5 1.3/3.7	1.7 0.8/2.5	0.8 0.3/1.4	0.3 0.1/0.6	1.8 1.4/2.1
Tilt=Latitude	Average Min/Max	0.6 0.2/1.5	1.5 0.4/3.9	2.8 1.0/4.8	3.6 2.1/6.0	3.7 2.2/5.4	3.5 1.9/5.7	3.4 1.6/5.0	2.9 1.5/4.3	2.3 1.1/3.5	1.4 0.6/2.3	0.8 0.3/1.5	2.3 1.8/2.6
2-Axis	Average Min/Max	0.7 0.2/1.6	1.5 0.4/4.0	2.8 1.0/4.9	3.7 2.1/6.1	4.0 2.3/5.7	3.8 2.1/6.2	3.7 1.7/5.4	3.0 1.6/4.4	2.3 1.1/3.5	1.4 0.6/2.3	0.9 0.3/1.5	2.3 1.9/2.7

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-9.5	-7.4	-3.5	2.1	8.1	12.4	14.7	13.5	9.1	1.4	-6.0	-8.7	2.2
Daily Minimum Temp	-13.1	-11.4	-7.7	-1.9	3.8	8.4	10.9	9.7	5.3	-1.8	-9.4	-12.2	-1.6
Daily Maximum Temp	-5.9	-3.4	0.6	6.0	12.4	16.4	18.4	17.2	12.9	4.7	-2.7	-5.3	5.9
Record Minimum Temp	-36.7	-32.2	-31.1	-20.0	-8.3	0.6	3.3	-0.6	-6.7	-20.6	-29.4	-34.4	-36.7
Record Maximum Temp	10.0	8.9	10.6	18.3	25.0	29.4	27.8	22.8	16.1	11.7	8.3	29.4	36.7
HDD, Base 18.3°C	803	720	677	487	317	177	114	150	277	523	730	839	5872
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	74	71	66	64	62	66	71	75	76	75	77	77	71
Wind Speed (m/s)	2.9	3.1	3.0	3.3	3.7	3.8	3.2	3.1	3.0	3.0	2.9	2.8	3.1

LATITUDE: 55.03° N  
LONGITUDE: 131.57° W  
ELEVATION: 34 meters  
MEAN PRESSURE: 1009 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.6 Min/Max 0.4/0.9	1.2 0.9/1.6	2.2 1.6/3.0	3.5 2.7/4.4	4.7 4.0/5.4	5.0 4.1/6.4	4.9 3.5/5.9	4.0 3.2/4.8	2.7 2.2/3.3	1.4 1.3/1.8	0.7 0.6/1.1	0.5 0.3/0.6	2.6 2.4/2.8
Latitude -15	Average 1.2 Min/Max 0.7/2.3	2.1 1.0/3.7	3.1 1.9/4.6	4.1 2.9/5.4	4.9 4.0/5.8	4.9 3.9/6.4	4.9 3.4/6.1	4.4 3.3/5.5	3.5 2.5/4.5	2.1 1.5/2.9	1.3 0.8/2.6	0.9 0.4/1.5	3.1 2.7/3.4
Latitude	Average 1.4 Min/Max 0.7/2.7	2.2 1.0/4.1	3.1 1.8/4.8	4.0 2.8/5.3	4.5 3.7/5.4	4.5 3.5/5.9	4.5 3.1/5.7	4.2 3.1/5.2	3.5 2.4/4.5	2.1 1.5/3.0	1.5 0.8/3.0	1.1 0.4/1.7	3.0 2.6/3.3
Latitude +15	Average 1.4 Min/Max 0.7/2.8	2.2 1.0/4.3	3.0 1.7/4.7	3.6 2.5/4.8	4.0 3.2/4.7	3.9 3.1/5.1	3.9 2.7/4.9	3.7 2.8/4.7	3.2 2.3/4.3	2.1 1.4/3.0	1.5 0.8/3.1	1.1 0.4/1.9	2.8 2.4/3.1
90	Average 1.4 Min/Max 0.7/2.8	2.1 0.9/4.1	2.6 1.5/4.1	2.9 2.0/3.9	3.0 2.5/3.6	2.8 2.3/3.6	2.9 2.0/3.6	2.9 2.2/3.6	2.7 1.9/3.6	1.8 1.2/2.7	1.4 0.7/3.0	1.1 0.4/1.9	2.3 2.0/2.5

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.9 Min/Max 0.5/1.6	1.8 0.9/3.1	3.1 1.9/4.8	4.7 3.3/6.7	6.1 4.5/7.7	6.4 4.7/8.9	6.3 3.8/8.5	5.3 3.8/7.1	3.7 2.6/5.1	1.9 1.4/2.6	1.0 0.6/2.0	0.6 0.3/1.0	3.5 2.9/3.8
Latitude -15	Average 1.4 Min/Max 0.7/2.7	2.4 1.1/4.6	3.7 2.1/6.0	5.3 3.5/7.5	6.4 4.6/8.2	6.5 4.7/9.3	6.4 3.8/8.9	5.7 4.0/7.8	4.3 2.9/6.1	2.3 1.6/3.4	1.5 0.8/3.1	1.0 0.4/1.7	3.9 3.3/4.3
Latitude	Average 1.5 Min/Max 0.8/3.0	2.5 1.1/4.9	3.7 2.0/6.1	5.2 3.4/7.4	6.2 4.4/7.9	6.2 4.4/8.9	6.2 3.5/8.6	5.6 3.8/7.6	4.3 2.9/6.1	2.4 1.6/3.6	1.6 0.8/3.4	1.1 0.4/1.9	3.9 3.2/4.3
Latitude +15	Average 1.6 Min/Max 0.8/3.2	2.5 1.0/5.1	3.6 2.0/6.0	4.9 3.3/7.2	5.9 4.1/7.5	5.8 4.1/8.4	5.8 3.3/8.1	5.3 3.6/7.2	4.2 2.7/5.9	2.4 1.5/3.6	1.6 0.8/3.5	1.2 0.4/2.0	3.7 3.1/4.1

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 1.6 Min/Max 0.8/3.2	2.5 1.1/5.1	3.8 2.1/6.1	5.3 3.5/7.6	6.6 4.7/8.3	6.7 4.9/9.5	6.6 3.9/9.1	5.8 4.0/7.8	4.4 2.9/6.1	2.4 1.6/3.6	1.7 0.8/3.5	1.2 0.4/2.0	4.0 3.4/4.4

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±8%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average 0.9 Min/Max 0.2/2.1	1.3 0.3/3.5	1.7 0.6/3.4	2.2 1.1/3.7	2.7 1.3/3.8	2.7 1.4/4.9	2.7 0.9/4.8	2.4 1.3/3.8	1.9 1.0/3.2	1.1 0.4/1.9	0.9 0.3/2.4	0.7 0.1/1.4	1.8 1.3/2.0
Horiz Axis	Average 0.4 Min/Max 0.1/1.1	0.9 0.2/2.4	1.6 0.6/3.4	2.7 1.3/4.7	3.5 1.6/5.0	3.4 1.8/6.3	3.5 1.1/6.2	3.0 1.6/4.9	2.1 1.1/3.6	0.9 0.3/1.5	0.5 0.2/1.4	0.3 0.1/0.6	1.9 1.4/2.3
1-Axis, N-S	Average 0.9 Min/Max 0.2/2.2	1.5 0.4/4.1	2.2 0.8/4.6	3.1 1.5/5.3	3.7 1.7/5.2	3.4 1.8/6.2	3.5 1.1/6.3	3.3 1.8/5.3	2.6 1.4/4.5	1.3 0.5/2.4	1.0 0.3/2.6	0.7 0.1/1.4	2.3 1.7/2.7
Tilt=Latitude	Average 1.0 Min/Max 0.3/2.3	1.6 0.4/4.2	2.2 0.8/4.6	3.1 1.5/5.4	3.9 1.8/5.5	3.7 2.0/6.8	3.8 1.2/6.8	3.4 1.8/5.5	2.6 1.4/4.5	1.3 0.5/2.4	1.0 0.3/2.7	0.7 0.1/1.5	2.4 1.8/2.8

Average Climatic Conditions

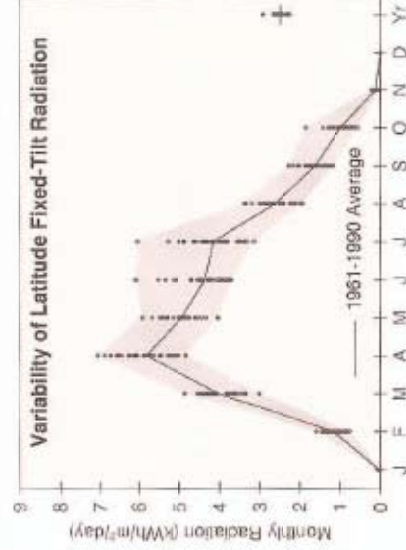
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	1.3	2.8	4.1	6.3	9.4	12.4	14.6	14.8	12.3	8.3	4.1	2.1	7.7
Daily Minimum Temp	-1.3	0.1	1.1	2.8	5.7	8.8	11.1	11.3	8.9	5.5	1.5	-0.3	4.6
Daily Maximum Temp	3.8	5.5	7.1	9.7	13.2	16.0	18.1	18.3	15.7	11.0	6.6	4.4	10.8
Record Minimum Temp	-17.2	-16.7	-17.2	-6.1	-0.6	2.8	4.4	4.4	0.6	-7.8	-19.4	-17.2	-19.4
Record Maximum Temp	16.1	17.2	16.7	27.8	31.1	31.7	31.7	32.2	27.8	21.7	19.4	16.7	32.2
HDD, Base 18.3°C	529	436	443	362	276	181	119	113	180	312	428	504	3882
CDD, Base 18.3°C	0	0	0	0	0	0	4	3	0	0	0	0	7
Relative Humidity (%)	78	78	76	75	75	77	79	81	82	83	80	80	79
Wind Speed (m/s)	4.9	5.0	4.4	4.4	3.8	3.7	3.4	3.4	3.7	4.8	5.0	4.8	4.2



**Barrow, AK****WBAN NO. 27502**

LATITUDE: 71.30° N  
 LONGITUDE: 156.78° W  
 ELEVATION: 4 meters  
 MEAN PRESSURE: 1016 millibars

STATION TYPE: Secondary

**Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±9%**

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.0 0.0/0.0	0.3 0.2/0.3	1.6 1.4/1.7	3.7 3.3/4.1	4.7 4.0/5.3	4.9 4.4/6.2	4.5 3.7/5.9	2.6 2.2/3.0	1.3 1.2/1.5	0.5 0.4/0.6	0.0 0.0/0.0	2.0 1.9/2.1
Latitude -15	Average Min/Max	0.0 0.0/0.1	1.1 0.7/1.5	3.8 2.9/4.6	5.8 4.9/7.0	5.2 4.3/6.6	4.8 4.1/6.6	4.6 3.5/6.6	2.8 2.1/3.6	1.7 1.2/2.3	0.9 0.6/1.7	0.1 0.0/0.2	2.6 2.3/3.0
Latitude	Average Min/Max	0.0 0.0/0.1	1.1 0.8/1.6	4.0 3.0/4.9	5.8 4.8/7.1	4.9 4.0/5.9	4.4 3.7/6.1	4.2 3.1/5.0	2.6 1.9/3.4	1.6 1.1/2.3	1.0 0.6/1.8	0.1 0.0/0.2	2.5 2.2/2.9
Latitude +15	Average Min/Max	0.0 0.0/0.1	1.2 0.8/1.6	4.0 3.0/4.8	5.6 4.6/6.7	4.6 3.6/5.5	3.8 3.2/5.4	3.6 2.7/5.2	2.3 1.7/3.0	1.5 1.0/2.1	1.0 0.5/1.9	0.1 0.0/0.2	2.3 2.1/2.7
90	Average Min/Max	0.0 0.0/0.1	1.2 0.8/1.6	3.9 2.9/4.8	5.4 4.5/6.6	4.5 3.5/5.4	3.6 3.0/5.1	3.4 2.6/5.0	2.2 1.6/2.9	1.4 1.0/2.0	1.0 0.5/1.8	0.1 0.0/0.2	2.2 2.0/2.6

**Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±9%**

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.0 0.0/0.0	0.5 0.4/0.7	3.2 2.5/3.9	6.5 5.4/8.3	6.3 4.7/7.6	6.4 5.0/9.1	6.0 4.4/9.3	3.2 2.3/4.1	1.6 1.2/2.3	0.7 0.4/1.1	0.0 0.0/0.1	2.9 2.5/3.3
Latitude -15	Average Min/Max	0.0 0.0/0.1	1.2 0.8/1.6	4.9 3.6/6.0	8.2 6.8/10.6	7.0 5.1/8.7	6.9 5.2/10.3	6.6 4.6/10.6	3.5 2.3/4.8	1.9 1.3/2.9	1.0 0.6/2.0	0.1 0.0/0.2	3.5 3.0/4.1
Latitude	Average Min/Max	0.0 0.0/0.1	1.2 0.8/1.7	5.0 3.7/6.1	8.2 6.8/10.6	6.9 5.0/8.6	6.7 5.0/10.1	6.4 4.4/10.4	3.4 2.2/4.7	1.9 1.2/2.9	1.1 0.6/2.1	0.1 0.0/0.2	3.4 3.0/4.1
Latitude +15	Average Min/Max	0.0 0.0/0.1	1.3 0.8/1.8	5.0 3.7/6.1	8.0 6.7/10.4	6.7 4.8/8.3	6.4 4.8/9.7	6.1 4.1/10.0	3.2 2.0/4.4	1.8 1.2/2.8	1.1 0.6/2.1	0.1 0.0/0.2	3.3 2.9/4.0

**Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±9%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	0.0 0.0/0.1	1.3 0.8/1.8	5.0 3.7/6.1	8.3 6.9/10.6	7.1 5.2/8.8	7.3 5.5/10.7	6.9 4.8/11.1	3.6 2.4/4.9	1.9 1.3/3.0	1.1 0.6/2.1	0.1 0.0/0.2	3.6 3.1/4.2

**Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±8%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average Min/Max	0.0 0.0/0.1	0.8 0.4/1.2	2.7 1.6/3.5	3.6 2.6/5.1	2.0 0.8/3.2	2.6 1.3/4.8	2.8 1.4/5.6	1.1 0.4/1.9	0.5 0.2/1.2	0.1 0.1/1.1	0.0 0.0/0.2	1.4 1.1/1.8
1-Axis, N-S	Average Min/Max	0.0 0.0/0.0	0.3 0.2/0.5	2.0 1.3/2.7	3.9 2.7/5.8	2.4 0.9/3.8	3.0 1.5/5.4	3.2 1.5/6.4	1.2 0.5/2.2	0.5 0.1/1.2	0.2 0.1/0.6	0.0 0.0/0.0	1.4 1.0/1.8
1-Axis, N-S Tilt=Latitude	Average Min/Max	0.0 0.0/0.1	0.9 0.5/1.3	3.4 2.2/4.6	5.1 3.7/7.5	2.8 1.0/4.4	3.4 1.7/6.1	3.6 1.8/7.3	1.5 0.6/2.7	0.7 0.2/1.7	0.4 0.1/1.3	0.1 0.0/0.2	1.8 1.4/2.4
2-Axis	Average Min/Max	0.0 0.0/0.1	0.9 0.5/1.3	3.4 2.2/4.6	5.2 3.7/7.6	2.9 1.1/4.7	3.7 1.8/6.6	3.9 1.9/7.9	1.6 0.6/2.8	0.7 0.2/1.8	0.5 0.1/1.3	0.1 0.0/0.2	1.9 1.5/2.5

**Average Climatic Conditions**

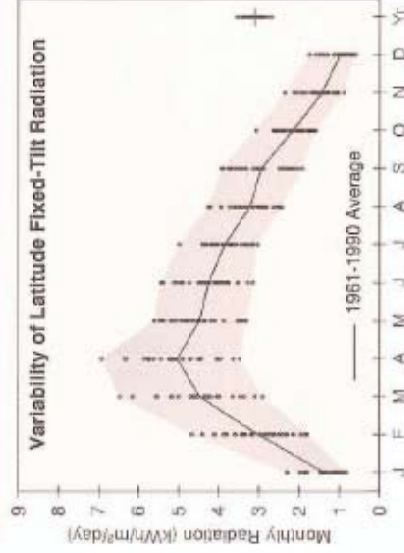
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-25.2	-27.7	-26.2	-19.0	-7.1	1.1	4.1	3.3	-0.8	-10.3	-18.7	-24.0	-12.6
Daily Minimum Temp	-28.5	-30.9	-29.5	-22.8	-9.8	-1.3	0.9	0.7	-2.8	-12.9	-21.6	-27.3	-15.5
Daily Maximum Temp	-21.9	-24.3	-22.8	-15.2	-4.3	3.5	7.2	5.7	1.0	-7.7	-15.8	-20.7	-9.6
Record Minimum Temp	-47.2	-48.9	-46.7	-41.1	-28.3	-15.6	-5.6	-6.7	-17.2	-35.6	-40.0	-48.3	-48.9
Record Maximum Temp	2.2	2.2	0.6	5.6	7.2	21.7	25.6	24.4	16.7	6.1	3.9	1.1	25.6
HDD, Base 18.3°C	1350	1288	1379	1120	787	517	443	467	575	887	1112	1312	11257
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	73	70	71	77	87	89	88	91	91	86	79	74	81
Wind Speed (m/s)	5.5	5.0	5.1	5.2	5.3	5.3	5.2	5.6	6.0	5.8	5.6	5.2	5.4

## Bethel, AK

WBAN NO. 26615

LATITUDE: 60.78° N  
LONGITUDE: 161.80° W  
ELEVATION: 46 meters  
MEAN PRESSURE: 1003 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m <sup>2</sup> /day), Uncertainty ±9%												
Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
0	Average 0.4 Min/Max 0.3/0.5	Average 1.1 Min/Max 0.9/1.4	Average 2.5 Min/Max 2.0/3.1	Average 3.9 Min/Max 3.1/4.8	Average 4.5 Min/Max 3.7/5.3	Average 4.8 Min/Max 3.9/5.8	Average 4.8 Min/Max 3.7/5.1	Average 3.2 Min/Max 2.6/3.8	Average 2.2 Min/Max 1.8/2.7	Average 1.2 Min/Max 1.0/1.4	Average 0.5 Min/Max 0.4/0.6	Average 0.2 Min/Max 0.2/0.3
Latitude -15	Average 1.2 Min/Max 0.7/2.0	Average 2.7 Min/Max 1.7/4.2	Average 4.3 Min/Max 2.8/6.1	Average 5.1 Min/Max 3.6/6.8	Average 4.8 Min/Max 3.6/5.9	Average 4.7 Min/Max 3.5/5.9	Average 4.7 Min/Max 3.4/5.4	Average 3.4 Min/Max 2.6/4.5	Average 3.0 Min/Max 2.0/3.9	Average 2.1 Min/Max 1.6/2.9	Average 1.3 Min/Max 0.8/2.1	Average 0.8 Min/Max 0.5/1.5
Latitude	Average 1.4 Min/Max 0.8/2.3	Average 3.0 Min/Max 1.8/4.7	Average 4.5 Min/Max 2.9/6.5	Average 5.0 Min/Max 3.5/6.9	Average 4.5 Min/Max 3.3/5.6	Average 4.2 Min/Max 3.1/5.4	Average 3.8 Min/Max 2.4/4.3	Average 3.2 Min/Max 2.4/4.3	Average 2.9 Min/Max 1.9/3.9	Average 2.2 Min/Max 1.6/3.1	Average 1.4 Min/Max 0.9/2.4	Average 1.0 Min/Max 0.6/1.7
Latitude +15	Average 1.5 Min/Max 0.9/2.5	Average 3.1 Min/Max 1.8/4.9	Average 4.4 Min/Max 2.8/6.5	Average 4.7 Min/Max 3.2/6.7	Average 4.0 Min/Max 2.9/5.2	Average 3.6 Min/Max 2.7/4.7	Average 3.3 Min/Max 2.6/4.3	Average 2.9 Min/Max 2.1/3.8	Average 2.8 Min/Max 1.8/3.7	Average 2.1 Min/Max 1.5/3.1	Average 1.5 Min/Max 0.9/2.5	Average 1.0 Min/Max 0.6/1.9
90	Average 1.5 Min/Max 0.8/2.5	Average 3.1 Min/Max 1.8/4.8	Average 4.2 Min/Max 2.7/6.2	Average 4.3 Min/Max 2.7/6.1	Average 3.3 Min/Max 2.4/4.6	Average 3.0 Min/Max 2.2/3.8	Average 2.7 Min/Max 2.2/3.5	Average 2.4 Min/Max 1.8/3.2	Average 2.5 Min/Max 1.5/3.3	Average 2.0 Min/Max 1.4/2.9	Average 1.5 Min/Max 0.9/2.5	Average 1.1 Min/Max 0.6/1.9

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m <sup>2</sup> /day), Uncertainty ±9%												
Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
0	Average 0.7 Min/Max 0.4/1.1	Average 2.1 Min/Max 1.4/3.2	Average 4.1 Min/Max 2.7/6.0	Average 5.9 Min/Max 4.0/8.3	Average 6.1 Min/Max 4.5/8.0	Average 6.1 Min/Max 4.2/8.3	Average 5.3 Min/Max 3.8/7.1	Average 4.0 Min/Max 3.0/5.4	Average 3.1 Min/Max 2.0/4.2	Average 1.7 Min/Max 1.3/2.4	Average 0.8 Min/Max 0.6/1.3	Average 0.4 Min/Max 0.3/0.7
Latitude -15	Average 1.3 Min/Max 0.8/2.3	Average 3.3 Min/Max 1.9/5.2	Average 5.5 Min/Max 3.3/8.2	Average 6.9 Min/Max 4.4/10.0	Average 6.6 Min/Max 4.6/8.7	Average 6.3 Min/Max 4.1/8.7	Average 5.5 Min/Max 3.7/7.6	Average 4.3 Min/Max 3.0/6.0	Average 3.7 Min/Max 2.3/5.2	Average 2.4 Min/Max 1.7/3.5	Average 1.4 Min/Max 0.9/2.4	Average 0.9 Min/Max 0.6/1.6
Latitude	Average 1.5 Min/Max 0.9/2.5	Average 3.5 Min/Max 2.0/5.6	Average 5.6 Min/Max 3.4/8.5	Average 6.9 Min/Max 4.4/10.0	Average 6.4 Min/Max 4.4/8.5	Average 6.0 Min/Max 3.8/8.4	Average 5.3 Min/Max 3.5/7.4	Average 4.1 Min/Max 2.9/5.9	Average 3.7 Min/Max 2.2/5.2	Average 2.5 Min/Max 1.8/3.7	Average 1.6 Min/Max 0.9/2.6	Average 1.0 Min/Max 0.6/1.9
Latitude +15	Average 1.6 Min/Max 0.9/2.7	Average 3.6 Min/Max 2.0/5.7	Average 5.6 Min/Max 3.3/8.5	Average 6.7 Min/Max 4.2/9.8	Average 6.0 Min/Max 4.1/8.1	Average 5.6 Min/Max 3.5/7.9	Average 4.9 Min/Max 3.2/6.9	Average 3.9 Min/Max 2.7/5.6	Average 3.5 Min/Max 2.1/5.0	Average 2.5 Min/Max 1.7/3.7	Average 1.6 Min/Max 1.0/2.8	Average 1.1 Min/Max 0.6/2.0

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m <sup>2</sup> /day), Uncertainty ±9%												
Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2-Axis	Average 1.6 Min/Max 0.9/2.7	Average 3.6 Min/Max 2.1/5.7	Average 5.6 Min/Max 3.4/8.5	Average 6.9 Min/Max 4.5/10.0	Average 6.7 Min/Max 4.7/8.9	Average 6.5 Min/Max 4.3/9.0	Average 5.7 Min/Max 3.9/7.8	Average 4.3 Min/Max 3.1/6.1	Average 3.7 Min/Max 2.3/5.2	Average 2.5 Min/Max 1.8/3.7	Average 1.6 Min/Max 1.0/2.8	Average 1.1 Min/Max 0.7/2.0

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m <sup>2</sup> /day), Uncertainty ±8%												
Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1-Axis, E-W	Average 1.0 Min/Max 0.4/2.0	Average 2.1 Min/Max 0.8/4.0	Average 2.7 Min/Max 1.0/5.0	Average 2.9 Min/Max 0.9/4.8	Average 2.6 Min/Max 1.3/4.1	Average 2.4 Min/Max 0.7/4.0	Average 1.9 Min/Max 0.6/3.6	Average 1.4 Min/Max 0.6/2.8	Average 1.5 Min/Max 0.6/2.5	Average 1.3 Min/Max 0.7/2.2	Average 1.0 Min/Max 0.4/1.9	Average 0.7 Min/Max 0.3/1.5
1-Axis, N-S	Average 0.4 Min/Max 0.2/0.8	Average 1.3 Min/Max 0.5/2.5	Average 2.5 Min/Max 0.8/4.6	Average 3.4 Min/Max 1.1/5.9	Average 3.4 Min/Max 1.7/5.3	Average 3.1 Min/Max 0.9/5.2	Average 2.5 Min/Max 0.7/4.5	Average 1.7 Min/Max 0.8/3.4	Average 1.6 Min/Max 0.6/2.7	Average 0.9 Min/Max 0.5/1.6	Average 0.4 Min/Max 0.2/0.9	Average 0.2 Min/Max 0.1/0.5
1-Axis, N-S Tilt-Latitude	Average 1.0 Min/Max 0.4/2.0	Average 2.4 Min/Max 0.9/4.6	Average 3.6 Min/Max 1.3/6.7	Average 4.1 Min/Max 1.3/7.1	Average 3.6 Min/Max 1.8/5.7	Average 3.2 Min/Max 1.0/5.3	Average 2.6 Min/Max 0.8/4.7	Average 2.0 Min/Max 0.9/4.0	Average 2.1 Min/Max 0.8/3.5	Average 1.5 Min/Max 0.9/2.7	Average 1.0 Min/Max 0.5/2.0	Average 0.7 Min/Max 0.3/1.5
2-Axis	Average 1.1 Min/Max 0.4/2.2	Average 2.5 Min/Max 0.9/4.7	Average 3.6 Min/Max 1.3/6.7	Average 4.2 Min/Max 1.3/7.2	Average 3.8 Min/Max 1.9/6.0	Average 3.4 Min/Max 1.1/5.7	Average 2.8 Min/Max 0.8/5.1	Average 2.0 Min/Max 0.9/4.1	Average 2.1 Min/Max 0.8/3.5	Average 1.5 Min/Max 0.9/2.7	Average 1.1 Min/Max 0.5/2.1	Average 0.8 Min/Max 0.3/1.6

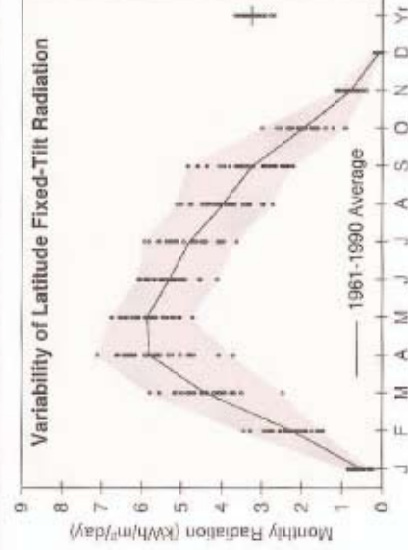
Average Climatic Conditions												
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temperature (°C)	-14.1	-14.4	-10.4	-4.7	-4.4	10.3	12.8	11.6	7.3	-1.4	-8.4	-13.1
Daily Minimum Temp	-17.6	-18.2	-14.8	-9.1	-0.2	5.7	8.7	7.9	3.5	-4.6	-11.7	-16.6
Daily Maximum Temp	-10.6	-10.7	-6.1	-0.4	9.0	14.9	16.8	15.3	11.1	-1.7	-5.2	-9.6
Record Minimum Temp	-44.4	-38.9	-39.4	-30.0	-15.6	-2.2	-0.6	-2.2	-7.8	-20.6	-31.1	-38.3
Record Maximum Temp	8.9	7.8	7.8	12.8	26.1	30.0	28.3	28.9	22.2	13.3	8.9	7.2
HDD, Base 18.3°C	1004	918	891	690	432	242	172	208	330	613	803	973
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	76	73	78	80	76	76	80	84	83	84	82	77
Wind Speed (m/s)	6.5	6.8	6.3	5.8	5.2	5.0	4.8	4.9	5.2	5.6	5.9	6.4



**Bettles, AK****WBAN NO. 26533**

LATITUDE: 66.92° N  
 LONGITUDE: 151.52° W  
 ELEVATION: 205 meters  
 MEAN PRESSURE: 988 millibars

STATION TYPE: Secondary

Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$ 

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.1 Min/Max 0.1/0.1	0.6 0.4/0.7	2.0 1.5/2.2	3.9 2.8/4.4	5.3 4.6/6.0	5.7 4.7/6.3	5.0 4.1/5.8	3.5 2.7/4.2	2.1 1.7/2.6	0.8 0.6/1.0	0.2 0.1/0.2	0.0 0.0/0.0	2.4 2.1/2.6
Latitude -15	Average 0.4 Min/Max 0.2/0.7	2.0 1.4/3.1	4.2 2.4/5.4	5.8 3.7/7.0	6.2 5.1/7.2	5.8 4.6/6.6	5.2 4.0/6.4	4.2 2.9/5.4	3.3 2.3/4.8	1.9 0.9/2.8	0.7 0.3/1.0	0.1 0.0/0.2	3.3 2.8/3.7
Latitude	Average 0.5 Min/Max 0.2/0.8	2.2 1.5/3.4	4.4 2.5/5.8	5.8 3.7/7.1	5.9 4.7/6.8	5.3 4.1/6.1	4.8 3.6/5.9	4.0 2.7/5.1	3.2 2.2/4.8	2.0 0.9/3.0	0.8 0.4/1.1	0.1 0.0/0.2	3.2 2.7/3.6
Latitude +15	Average 0.5 Min/Max 0.3/0.9	2.3 1.5/3.6	4.4 2.4/5.8	5.5 3.5/6.8	5.2 4.2/6.2	4.5 3.5/5.2	4.1 3.1/5.1	3.5 2.4/4.6	3.0 2.1/4.6	0.8 0.9/3.0	0.1 0.4/1.2	0.1 0.0/0.2	3.0 2.5/3.4
90	Average 0.5 Min/Max 0.3/0.9	2.3 1.5/3.5	4.3 2.4/5.7	5.3 3.4/6.5	4.8 3.8/5.8	4.1 3.1/4.6	3.7 2.8/4.6	3.2 2.2/4.2	2.9 1.9/4.3	1.9 0.9/3.0	0.8 0.4/1.2	0.1 0.0/0.2	2.8 2.3/3.2

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$ 

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.1 Min/Max 0.1/0.2	1.3 0.9/1.9	3.8 2.1/4.8	6.6 4.1/8.3	8.3 6.6/10.2	8.3 6.4/9.6	7.1 5.1/9.0	5.0 3.4/6.8	3.2 2.2/4.9	1.4 0.7/2.0	0.3 0.2/0.4	0.0 0.0/0.0	3.8 3.1/4.3
Latitude -15	Average 0.5 Min/Max 0.2/0.8	2.3 1.5/3.6	5.4 2.8/7.2	8.1 4.9/10.4	9.4 7.3/11.6	9.0 6.7/10.5	7.7 5.3/9.9	5.8 3.7/7.9	4.2 2.7/6.6	2.1 0.9/3.3	0.8 0.4/1.1	0.1 0.0/0.2	4.6 3.7/5.3
Latitude	Average 0.5 Min/Max 0.2/0.9	2.5 1.6/3.9	5.5 2.9/7.4	8.1 4.9/10.4	9.2 7.1/11.4	8.8 6.5/10.3	7.5 5.1/9.7	5.6 3.6/7.8	4.2 2.7/6.6	2.2 0.9/3.5	0.8 0.4/1.2	0.1 0.0/0.2	4.6 3.7/5.3
Latitude +15	Average 0.6 Min/Max 0.3/0.9	2.6 1.6/4.0	5.5 2.9/7.4	7.9 4.8/10.3	8.8 6.8/11.0	8.3 6.2/9.8	7.1 4.7/9.2	5.3 3.4/7.4	4.0 2.6/6.4	2.2 0.9/3.5	0.9 0.4/1.3	0.1 0.0/0.2	4.5 3.5/5.1

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$ 

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 0.6 Min/Max 0.3/0.9	2.6 1.6/4.0	5.5 2.9/7.4	8.1 4.9/10.4	9.5 7.5/11.9	9.4 7.1/11.0	8.0 5.5/10.3	5.8 3.8/8.0	4.2 2.8/6.6	2.3 1.0/3.5	0.9 0.4/1.3	0.1 0.0/0.2	4.8 3.8/5.5

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 8\%$ 

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average 0.5 Min/Max 0.2/0.8	1.6 0.8/2.9	2.9 1.1/4.4	3.5 1.8/5.1	4.2 2.4/6.1	4.2 2.7/5.3	3.4 1.6/4.8	2.4 1.2/3.7	2.0 1.0/3.7	1.2 0.3/2.1	0.6 0.2/0.9	0.1 0.0/0.2	2.2 1.5/2.7
1-Axis, N-S	Average 0.1 Min/Max 0.0/0.2	0.8 0.4/1.5	2.4 0.8/3.6	3.9 2.0/5.9	5.3 3.2/7.7	5.1 3.2/6.5	4.2 2.0/5.9	2.8 1.4/4.6	1.9 0.9/3.7	0.7 0.2/1.2	0.2 0.1/0.3	0.0 0.0/0.0	2.3 1.5/2.8
1-Axis, N-S Tilt-Latitude	Average 0.5 Min/Max 0.2/0.8	1.8 0.9/3.2	3.8 1.4/5.7	5.0 2.5/7.5	5.9 3.6/8.5	5.3 3.5/6.9	4.5 2.2/6.5	3.3 1.7/5.4	2.7 1.4/5.1	1.3 0.3/2.5	0.6 0.2/0.9	0.1 0.0/0.2	2.9 2.0/3.6
2-Axis	Average 0.5 Min/Max 0.2/0.9	1.8 0.9/3.3	3.8 1.4/5.7	5.1 2.6/7.6	6.2 3.8/9.0	6.0 3.8/7.6	4.8 2.3/6.9	3.5 1.7/5.5	2.7 1.4/5.2	1.4 0.3/2.5	0.6 0.2/1.0	0.1 0.0/0.2	3.0 2.1/3.8

Average Climatic Conditions

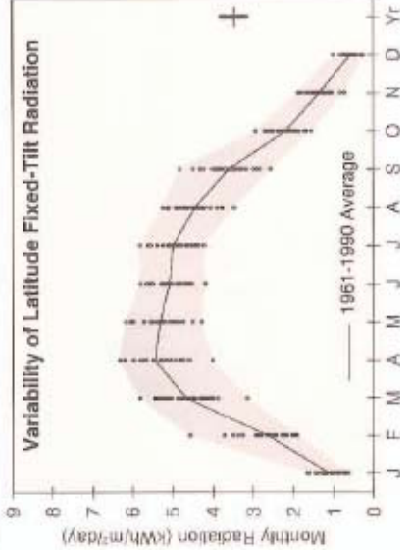
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-24.8	-22.8	-16.2	-6.3	6.2	14.0	15.2	11.8	4.9	-7.5	-18.8	-22.9	-5.6
Daily Minimum Temp	-29.1	-27.9	-22.6	-12.4	0.8	8.3	9.6	6.6	0.2	-11.1	-22.7	-27.1	-10.6
Daily Maximum Temp	-20.5	-17.6	-9.8	-0.3	11.6	19.7	20.9	17.1	9.4	-3.9	-14.9	-18.8	-0.6
Record Minimum Temp	-56.7	-51.1	-48.9	-38.3	-23.3	-2.8	-1.7	-5.6	-16.7	-35.6	-49.4	-50.6	-56.7
Record Maximum Temp	8.9	4.4	6.7	13.3	30.0	33.3	33.9	30.6	26.1	11.7	7.2	3.3	33.9
HDD, Base 18.3°C	1338	1151	1069	738	376	132	107	207	403	801	1113	1279	8716
CDD, Base 18.3°C	0	0	0	0	0	0	10	6	0	0	0	0	16
Relative Humidity (%)	69	66	65	67	61	60	68	76	76	78	73	72	69
Wind Speed (m/s)	2.7	2.8	3.2	3.4	3.4	3.2	3.0	2.7	3.0	2.7	2.7	2.5	3.0

## Big Delta, AK

WBAN NO. 26415

LATITUDE: 64.00° N  
LONGITUDE: 145.73° W  
ELEVATION: 388 meters  
MEAN PRESSURE: 963 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year	
0	Average Min/Max	0.2 0.2/0.2	0.8 0.7/1.1	2.3 1.8/2.5	3.9 3.2/4.3	5.1 4.4/5.7	5.5 4.7/6.2	5.2 4.5/5.8	3.9 3.3/4.3	2.4 2.0/2.8	1.1 0.9/1.2	0.3 0.3/0.4	0.1 0.1/0.1	2.6 2.4/2.7
Latitude -15	Average Min/Max	1.0 0.6/1.4	2.4 1.8/4.1	4.4 3.0/5.5	5.5 4.1/6.3	5.7 4.6/6.6	5.6 4.6/6.4	5.4 4.6/6.3	4.7 3.7/5.5	3.6 2.6/4.8	2.1 1.5/2.7	1.2 0.6/1.6	0.5 0.2/0.9	3.5 3.2/3.8
Latitude	Average Min/Max	1.1 0.6/1.6	2.6 1.9/4.6	4.6 3.1/5.8	5.4 4.0/6.3	5.3 4.3/6.2	5.1 4.2/5.8	5.0 4.2/5.8	4.4 3.5/5.2	3.6 2.6/4.8	2.2 1.5/2.9	1.3 0.7/1.9	0.6 0.3/1.0	3.4 3.1/3.8
Latitude +15	Average Min/Max	1.2 0.6/1.8	2.7 2.0/4.8	4.6 3.1/5.8	5.1 3.7/6.1	4.7 3.7/5.4	4.4 3.6/5.0	4.3 3.6/5.0	4.0 3.1/4.7	3.4 2.4/4.6	2.2 1.5/2.9	1.4 0.7/2.0	0.6 0.3/1.1	3.2 2.9/3.5
90	Average Min/Max	1.2 0.6/1.8	2.7 1.9/4.7	4.5 3.0/5.6	4.8 3.3/5.7	4.1 3.2/4.8	3.7 3.1/4.2	3.7 3.1/4.3	3.5 2.7/4.2	3.1 2.2/4.3	2.1 1.4/2.8	1.4 0.7/2.0	0.6 0.3/1.1	2.9 2.7/3.3

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.4 0.3/0.6	1.7 1.2/2.8	4.1 2.7/5.2	7.6 4.7/7.5	7.6 6.0/9.3	7.6 5.9/9.3	5.6 4.4/6.7	3.6 2.6/4.8	1.6 1.2/2.1	0.7 0.4/0.9	0.2 0.1/0.3	3.9 3.5/4.3
Latitude -15	Average Min/Max	1.1 0.6/1.6	2.8 2.0/5.0	5.7 3.7/7.3	7.6 5.5/9.1	8.3 6.5/10.3	8.1 6.2/10.0	6.4 4.8/7.8	4.6 3.2/6.3	2.4 1.7/3.3	1.3 0.7/1.9	0.5 0.2/0.9	4.7 4.2/5.3
Latitude	Average Min/Max	1.2 0.6/1.8	3.0 2.1/5.4	5.9 3.8/7.6	7.6 5.4/9.1	8.1 6.3/10.1	7.8 5.9/9.7	6.3 5.9/9.4	4.6 3.2/6.3	2.5 1.7/3.4	1.5 0.8/2.0	0.6 0.3/1.0	4.7 4.2/5.3
Latitude +15	Average Min/Max	1.3 0.7/1.9	3.1 2.2/5.5	5.9 3.7/7.6	7.3 5.2/9.0	7.7 5.9/9.6	7.4 5.6/9.2	5.9 4.4/7.3	4.5 3.0/6.2	2.5 1.7/3.4	1.5 0.8/2.1	0.6 0.3/1.1	4.6 4.0/5.1

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	1.3 0.7/1.9	3.1 2.2/5.5	5.9 3.8/7.6	7.6 5.5/9.1	8.3 6.6/10.5	8.4 6.4/10.4	6.5 4.9/7.9	4.7 3.2/6.4	2.5 1.7/3.5	1.5 0.8/2.1	0.6 0.3/1.1	4.9 4.4/5.5

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±8%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average Min/Max	0.9 0.4/1.5	1.9 0.9/4.0	3.1 1.7/4.4	3.8 2.1/4.4	3.6 2.3/5.0	3.6 2.2/5.0	2.8 1.7/3.8	2.2 1.2/3.5	1.2 0.6/2.1	1.0 0.4/1.6	0.5 0.2/1.0	2.3 1.9/2.8
1-Axis, N-S	Average Min/Max	0.3 0.1/0.5	1.0 0.5/2.3	2.7 1.3/4.0	3.9 2.3/5.2	4.8 3.0/6.6	4.5 2.8/6.3	3.3 2.1/4.5	2.2 1.2/3.4	0.8 0.4/1.4	0.4 0.1/0.6	0.1 0.1/0.2	2.4 1.9/2.8
1-Axis, N-S	Average Min/Max	0.9 0.4/1.5	2.1 1.1/4.6	4.1 2.1/5.9	5.2 3.3/7.2	4.7 2.9/6.6	4.7 2.8/6.6	3.9 2.4/5.3	3.0 1.7/4.7	1.5 0.8/2.5	1.0 0.4/1.6	0.5 0.2/0.9	3.0 2.5/3.6
2-Axis	Average Min/Max	1.0 0.4/1.6	2.2 1.1/4.7	4.1 2.1/5.9	5.5 3.3/7.6	5.1 3.2/7.2	5.1 3.0/7.1	4.0 2.5/5.4	3.0 1.7/4.7	1.5 0.8/2.5	1.1 0.4/1.7	0.5 0.2/1.0	3.1 2.6/3.8

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-20.0	-16.6	-10.3	-0.9	8.2	13.8	15.7	13.0	6.9	-4.2	-14.7	-18.7	-2.3
Daily Minimum Temp	-23.9	-21.2	-16.4	-6.4	2.7	8.4	10.4	7.8	2.1	-7.9	-18.7	-22.5	-7.1
Daily Maximum Temp	-16.1	-11.9	-4.2	4.6	13.7	19.1	20.9	18.2	11.8	-0.4	-10.7	-14.8	2.5
Record Minimum Temp	-52.8	-51.1	-45.0	-38.3	-18.3	-1.1	0.0	-5.6	-18.9	-39.4	-43.9	-52.2	-52.8
Record Maximum Temp	8.9	10.6	14.4	22.2	32.2	33.3	32.8	31.1	26.1	18.9	11.1	12.8	33.3
HDD, Base 18.3°C	1188	977	887	577	313	139	88	171	343	698	992	1147	7519
CDD, Base 18.3°C	0	0	0	0	0	0	5	5	0	0	0	0	10
Relative Humidity (%)	67	68	64	59	52	59	66	68	70	77	73	71	66
Wind Speed (m/s)	5.4	4.7	4.1	3.8	3.8	3.5	2.9	3.2	3.8	3.9	4.6	5.2	4.1

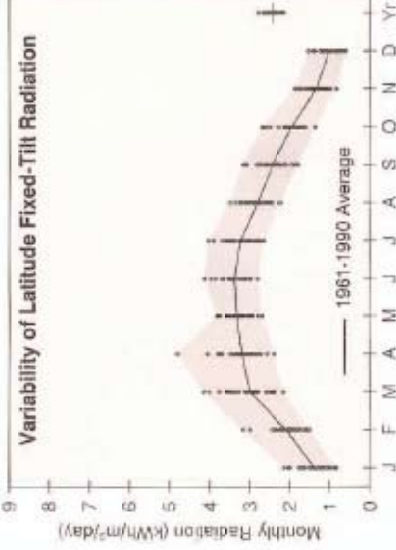


# Cold Bay, AK

WBAN NO. 25624

LATITUDE: 55.20° N  
LONGITUDE: 162.72° W  
ELEVATION: 29 meters  
MEAN PRESSURE: 1003 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty  $\pm 9\%$

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.6 Min/Max 0.5/0.8	1.2 1.0/1.5	2.2 1.8/2.8	3.1 2.6/4.1	3.7 3.1/4.1	3.9 3.1/4.6	3.7 3.2/4.3	3.0 2.5/3.5	2.2 1.8/2.6	1.4 1.2/1.6	0.7 0.5/0.9	0.4 0.3/0.5	2.2
Latitude -15	Average 1.2 Min/Max 0.8/1.9	2.0 1.4/2.9	3.0 2.2/4.0	3.3 2.6/4.8	3.6 3.0/4.1	3.7 3.1/4.5	3.5 3.0/4.4	3.0 2.4/3.7	2.5 1.9/3.2	1.9 1.4/2.6	1.2 0.8/1.7	0.9 0.5/1.3	2.5
Latitude	Average 1.4 Min/Max 0.8/2.1	2.1 1.5/3.2	3.0 2.2/4.2	3.2 2.4/4.8	3.3 2.7/3.8	3.4 2.8/4.1	3.2 2.7/4.0	2.8 2.3/3.5	2.4 1.8/3.2	2.0 1.4/2.7	1.3 0.8/1.9	1.0 0.6/1.5	2.4
Latitude +15	Average 1.4 Min/Max 0.8/2.3	2.1 1.5/3.3	2.9 2.0/4.1	2.9 2.1/4.6	2.9 2.4/3.4	2.9 2.4/3.6	2.8 2.3/3.5	2.5 2.0/3.1	2.2 1.6/3.0	1.9 1.3/2.7	1.4 0.8/1.9	1.1 0.6/1.6	2.3
90	Average 1.4 Min/Max 0.8/2.3	2.0 1.4/3.1	2.6 1.8/3.7	2.4 1.7/4.1	2.3 1.8/2.6	2.2 1.9/2.7	2.2 1.8/2.7	2.0 1.6/2.5	1.9 1.3/2.5	1.7 1.1/2.5	1.3 0.8/1.9	1.0 0.6/1.6	1.9

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty  $\pm 9\%$

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.9 Min/Max 0.6/1.3	1.7 1.3/2.5	2.9 2.1/4.0	3.6 2.6/5.3	4.2 3.3/5.0	4.3 3.5/5.5	4.0 3.2/5.2	3.3 2.5/4.2	2.6 1.9/3.4	1.7 1.3/2.3	0.9 0.6/1.3	0.6 0.4/0.9	2.6
Latitude -15	Average 1.4 Min/Max 0.8/2.2	2.2 1.6/3.5	3.5 2.4/5.0	3.9 2.7/5.9	4.2 3.2/5.1	4.3 3.4/5.6	4.0 3.2/5.3	3.4 2.5/4.4	2.8 2.0/3.9	2.1 1.5/3.0	1.3 0.8/1.9	1.0 0.6/1.5	2.9
Latitude	Average 1.5 Min/Max 0.9/2.4	2.3 1.6/3.8	3.6 2.4/5.1	3.8 2.5/5.9	4.1 3.1/4.9	4.1 3.2/5.3	3.8 3.0/5.1	3.2 2.3/4.3	2.8 1.9/3.9	2.2 1.5/3.1	1.4 0.8/2.1	1.1 0.6/1.6	2.8
Latitude +15	Average 1.6 Min/Max 0.9/2.5	2.4 1.6/3.8	3.5 2.3/5.1	3.7 2.4/5.8	3.8 2.8/4.6	3.8 3.0/4.9	3.5 2.8/4.7	3.0 2.1/4.0	2.7 1.8/3.7	2.2 1.4/3.1	1.5 0.9/2.1	1.1 0.6/1.8	2.7

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty  $\pm 9\%$

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 1.6 Min/Max 0.9/2.5	2.4 1.6/3.8	3.6 2.4/5.2	4.0 2.7/5.9	4.4 3.3/5.2	4.5 3.6/5.7	4.2 3.3/5.5	3.4 2.5/4.5	2.9 2.0/3.9	2.2 1.5/3.2	1.5 0.9/2.2	1.1 0.6/1.8	3.0

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty  $\pm 8\%$

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average 0.8 Min/Max 0.3/1.5	1.0 0.3/2.2	1.4 0.7/2.6	1.1 0.4/2.2	1.2 0.6/1.8	1.1 0.5/2.1	1.0 0.4/1.8	0.8 0.3/1.5	0.9 0.3/1.5	0.9 0.4/1.7	0.7 0.3/1.3	0.6 0.2/1.1	1.0
1-Axis, N-S Horiz Axis	Average 0.4 Min/Max 0.1/0.8	0.7 0.2/1.6	1.3 0.6/2.4	1.3 0.4/2.5	1.5 0.7/2.3	1.4 0.6/2.6	1.2 0.4/2.3	1.0 0.3/1.8	0.9 0.3/1.6	0.7 0.2/1.3	0.4 0.2/0.7	0.2 0.1/0.5	0.9
1-Axis, N-S Tilt-Latitude	Average 0.8 Min/Max 0.3/1.6	1.2 0.4/2.6	1.8 0.8/3.3	1.6 0.5/2.9	1.6 0.8/2.4	1.4 0.6/2.6	1.2 0.4/2.4	1.1 0.4/2.0	1.2 0.4/2.1	1.1 0.5/2.0	0.7 0.4/1.4	0.6 0.2/1.1	1.2
2-Axis	Average 0.9 Min/Max 0.3/1.7	1.2 0.4/2.7	1.8 0.8/3.3	1.6 0.5/3.0	1.6 0.8/2.5	1.5 0.7/2.8	1.3 0.5/2.6	1.1 0.4/2.0	1.2 0.4/2.1	1.1 0.5/2.0	0.8 0.4/1.5	0.6 0.3/1.2	1.2

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-1.9	-2.6	-1.2	0.7	4.2	7.6	10.3	10.8	8.7	4.2	1.3	-0.6	3.5
Daily Minimum Temp	-4.4	-5.1	-3.9	-1.9	1.6	4.9	7.8	8.4	6.2	1.6	-1.2	-3.0	0.9
Daily Maximum Temp	0.6	0.0	1.6	3.3	6.9	10.2	12.8	13.3	11.2	6.8	3.8	1.8	6.1
Record Minimum Temp	-22.2	-22.8	-25.0	-15.6	-7.8	-1.7	0.6	0.6	-2.8	-12.2	-17.2	-18.3	-25.0
Record Maximum Temp	10.0	10.0	13.3	15.6	19.4	20.6	25.0	25.6	24.4	20.6	15.0	12.2	25.6
HDD, Base 18.3°C	627	585	604	528	437	322	250	233	288	437	510	586	5407
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	84	84	83	82	82	84	87	88	85	82	83	84	84
Wind Speed (m/s)	8.0	8.0	7.7	8.0	7.3	7.1	7.0	7.2	7.4	7.6	7.8	7.8	7.6

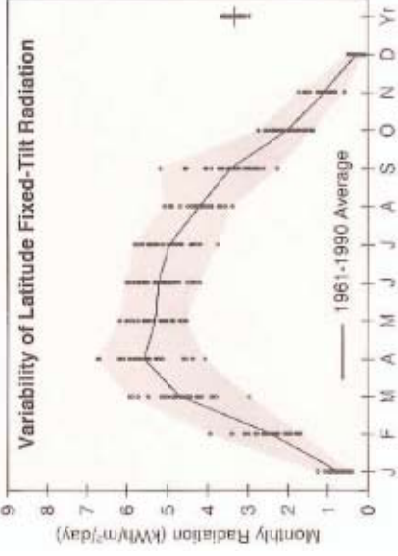


# Fairbanks, AK

WBAN NO. 26411

LATITUDE: 64.82° N  
LONGITUDE: 147.87° W  
ELEVATION: 138 meters  
MEAN PRESSURE: 994 millibars

STATION TYPE: Primary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day). Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.1 Min/Max 0.1/0.2	0.8 0.7/0.9	2.3 1.8/2.6	4.0 3.3/4.6	5.1 4.5/5.8	5.6 4.7/6.4	5.1 4.1/5.8	3.7 3.2/4.3	2.3 1.8/2.9	1.0 0.8/1.1	0.3 0.2/0.3	0.0 0.0/0.1	2.5 2.4/2.7
Latitude -15	Average 0.7 Min/Max 0.3/1.1	2.2 1.6/3.5	4.5 2.9/5.6	5.6 4.2/6.7	5.7 4.9/6.6	5.7 4.6/6.6	5.4 4.1/6.3	4.5 3.6/5.3	3.4 2.3/5.1	1.9 1.4/2.6	1.0 0.5/1.5	0.2 0.1/0.4	3.4 3.1/3.7
Latitude	Average 0.7 Min/Max 0.4/1.3	2.4 1.7/3.9	4.7 3.0/5.9	5.6 4.1/6.7	5.3 4.5/6.2	5.2 4.2/6.0	4.9 3.7/5.8	4.2 3.4/5.1	3.4 2.3/5.2	2.0 1.4/2.7	1.1 0.6/1.7	0.3 0.1/0.5	3.3 3.0/3.6
Latitude +15	Average 0.8 Min/Max 0.4/1.3	2.5 1.7/4.1	4.7 2.9/5.9	5.3 3.7/6.4	4.6 4.0/5.4	4.5 3.6/5.1	4.3 3.2/5.0	3.8 3.0/4.6	3.2 2.1/4.9	2.0 1.4/2.8	1.1 0.6/1.8	0.3 0.1/0.5	3.1 2.7/3.4
90	Average 0.8 Min/Max 0.4/1.4	2.5 1.7/4.1	4.5 2.8/5.8	4.9 3.4/6.1	4.1 3.5/4.8	3.9 3.1/4.4	3.7 2.8/4.4	3.3 2.7/4.1	3.0 1.9/4.6	2.0 1.3/2.7	1.1 0.6/1.8	0.3 0.1/0.5	2.8 2.5/3.1

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day). Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.3 Min/Max 0.2/0.5	1.5 1.1/2.3	4.1 2.5/5.2	6.4 4.7/7.8	7.5 6.1/9.0	7.8 6.0/9.4	7.1 5.0/8.6	5.3 4.0/6.6	3.4 2.4/5.2	1.5 1.1/1.9	0.5 0.3/0.8	0.1 0.0/0.1	3.8 3.3/4.2
Latitude -15	Average 0.7 Min/Max 0.4/1.2	2.6 1.8/4.2	5.7 3.4/7.4	7.7 5.5/9.5	8.2 6.6/10.1	8.3 6.3/10.1	7.6 5.3/9.4	6.0 4.4/7.6	4.4 2.8/6.9	2.2 1.5/3.0	1.1 0.5/1.7	0.2 0.1/0.4	4.6 3.9/5.1
Latitude	Average 0.8 Min/Max 0.4/1.3	2.7 1.9/4.6	5.8 3.5/7.7	7.7 5.4/9.6	8.0 6.4/9.8	8.0 6.0/9.8	7.4 5.0/9.1	5.8 4.3/7.4	4.4 2.8/6.9	2.3 1.5/3.2	1.2 0.6/1.9	0.3 0.1/0.5	4.5 3.9/5.0
Latitude +15	Average 0.8 Min/Max 0.4/1.4	2.8 1.9/4.7	5.8 3.4/7.7	7.4 5.2/9.3	7.6 6.1/9.3	7.6 5.7/9.3	6.9 4.7/8.6	5.5 4.0/7.1	4.2 2.7/6.8	2.3 1.5/3.2	1.2 0.6/2.0	0.3 0.1/0.5	4.4 3.7/4.9

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day). Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 0.8 Min/Max 0.4/1.4	2.8 1.9/4.7	5.8 3.5/7.7	7.7 5.5/9.6	8.4 6.8/10.3	8.7 6.6/10.5	7.9 5.5/9.7	6.0 4.5/7.7	4.4 2.8/7.0	2.3 1.5/3.2	1.2 0.6/2.0	0.3 0.1/0.5	4.7 4.1/5.2

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day). Uncertainty ±8%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average 0.6 Min/Max 0.2/1.1	1.6 0.8/3.3	2.9 1.2/4.4	3.2 1.6/4.6	3.6 2.3/4.9	3.7 2.3/4.8	3.3 1.8/4.6	2.5 1.5/3.5	2.0 1.0/3.8	1.1 0.5/1.8	0.7 0.2/1.4	0.3 0.1/0.5	2.1 1.7/2.6
1-Axis, N-S Horiz Axis	Average 0.2 Min/Max 0.1/0.4	0.8 0.4/1.8	2.4 1.0/3.8	3.7 1.8/5.3	4.6 3.0/6.2	4.5 2.8/6.1	4.1 2.2/5.7	2.9 1.8/4.3	2.0 1.1/3.7	0.7 0.3/1.1	0.3 0.1/0.5	0.1 0.0/0.1	2.2 1.7/2.6
1-Axis, N-S Tilt=Latitude	Average 0.6 Min/Max 0.2/1.1	1.8 0.9/3.7	3.8 1.5/5.8	4.6 2.3/6.6	5.0 3.2/6.8	4.8 3.0/6.4	4.3 2.3/6.1	3.4 2.1/5.0	2.8 1.5/5.2	1.3 0.6/2.1	0.8 0.2/1.4	0.3 0.1/0.5	2.8 2.1/3.3
2-Axis	Average 0.6 Min/Max 0.2/1.2	1.8 0.9/3.8	3.8 1.5/5.8	4.7 2.3/6.7	5.3 3.4/7.2	5.2 3.2/6.9	4.7 2.5/6.6	3.5 2.1/5.1	2.8 1.5/5.2	1.3 0.6/2.2	0.8 0.3/1.5	0.3 0.1/0.5	2.9 2.2/3.5

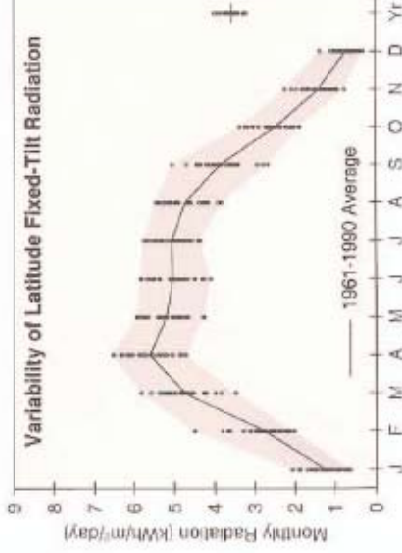
Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-23.4	-19.8	-11.7	-0.7	9.2	15.4	16.9	13.8	7.5	-3.8	-16.3	-21.4	-2.8
Daily Minimum Temp	-28.1	-25.8	-18.7	-6.4	3.3	9.7	11.4	8.4	2.3	-7.7	-20.9	-26.0	-8.2
Daily Maximum Temp	-18.7	-13.8	-4.6	5.0	15.2	21.2	22.4	19.1	12.7	0.0	-11.7	-16.8	2.5
Record Minimum Temp	-51.7	-48.9	-45.0	-31.1	-18.3	-0.6	1.7	-2.8	-12.2	-32.8	-43.3	-52.2	-52.2
Record Maximum Temp	10.0	8.3	10.6	23.3	31.7	35.6	34.4	32.2	28.9	18.3	7.8	6.7	35.6
HDD, Base 18.3°C	1293	1067	930	572	282	101	68	148	325	687	1038	1332	7744
CDD, Base 18.3°C	0	0	0	0	0	14	25	7	0	0	0	0	47
Relative Humidity (%)	70	66	60	56	50	57	64	71	69	74	73	71	65
Wind Speed (m/s)	1.5	1.9	2.5	3.1	3.5	3.4	3.1	2.9	2.8	2.5	1.7	1.5	2.5

**Gulkana, AK**

**WBAN NO. 26425**

LATITUDE: 62.15° N  
LONGITUDE: 145.45° W  
ELEVATION: 481 meters  
MEAN PRESSURE: 952 millibars  
STATION TYPE: Secondary



**Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty ±9%**

Solar Radiation per m <sup>2</sup> facing South at a 10° tilt (mJ/cm <sup>2</sup> /sec)														
Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.3 0.20/3	1.0 0.91/2	2.5 2.1/2.8	4.1 3.7/4.6	5.1 4.3/5.6	5.5 4.7/6.3	5.3 4.6/5.9	4.1 3.5/4.6	2.6 2.1/3.0	1.2 1.1/1.4	0.4 0.40/6	0.2 0.10/2	2.7 2.5/2.9
Latitude -15	Average Min/Max	1.1 0.6/1.8	2.5 1.9/4.0	4.5 3.3/5.5	5.6 4.8/6.5	5.6 4.6/6.3	5.5 4.5/6.4	5.5 4.7/6.3	5.0 4.1/5.7	3.9 2.7/5.0	2.4 1.8/3.1	1.3 0.7/2.0	0.6 0.3/1.2	3.6 3.3/4.0
Latitude	Average Min/Max	1.2 0.6/2.1	2.7 2.0/4.5	4.7 3.5/5.8	5.6 4.7/6.5	5.2 4.3/5.8	5.0 4.1/5.8	5.1 4.3/5.8	4.7 3.8/5.4	3.9 2.7/5.1	2.5 1.9/3.4	1.4 0.8/2.2	0.7 0.3/1.4	3.6 3.2/4.0
Latitude +15	Average Min/Max	1.3 0.6/2.2	2.8 2.1/4.7	4.7 3.4/5.8	5.3 4.3/6.3	4.6 3.7/5.3	4.3 3.5/5.0	4.4 3.8/5.0	4.3 3.4/4.9	3.6 2.5/4.8	2.5 1.9/3.4	1.5 0.8/2.4	0.8 0.3/1.5	3.3 3.0/3.7
90	Average Min/Max	1.3 0.6/2.2	2.8 2.0/4.6	4.5 3.3/5.6	4.8 3.8/5.8	3.9 3.2/4.6	3.6 2.9/4.1	3.7 3.2/4.2	3.7 3.0/4.2	3.3 2.2/4.4	2.4 1.8/3.3	1.5 0.8/2.4	0.8 0.3/1.5	3.0 2.7/3.4

**Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty ±9%**

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year	
0	Average Min/Max	0.6 0.30/9	1.8 1.4/2.9	4.3 3.0/5.3	6.6 5.5/7.9	7.5 5.9/8.6	7.7 6.1/9.3	7.4 5.8/8.9	6.0 4.7/7.1	4.0 2.8/5.2	1.9 1.5/2.5	0.8 0.5/1.2	0.3 0.10/5	4.1 3.6/4.6
Latitude -15	Average Min/Max	1.2 0.6/2.0	2.9 2.1/4.9	5.8 4.0/7.3	7.8 6.5/9.4	8.1 6.4/9.4	8.1 6.2/9.8	7.9 6.1/9.6	6.8 5.2/8.1	5.0 3.3/6.7	2.8 2.0/3.8	1.4 0.8/2.3	0.7 0.3/1.3	4.9 4.3/5.5
Latitude	Average Min/Max	1.3 0.6/2.2	3.1 2.2/5.3	6.0 4.1/7.5	7.8 6.4/9.4	7.9 6.3/9.2	7.8 5.9/9.5	7.6 5.9/9.3	6.7 5.1/7.9	5.0 3.3/6.7	2.9 2.1/4.0	1.5 0.8/2.5	0.8 0.3/1.4	4.9 4.2/5.5
Latitude +15	Average Min/Max	1.4 0.7/2.4	3.2 2.3/5.4	6.0 4.1/7.5	7.6 6.2/9.1	7.5 5.8/8.9	7.4 5.6/9.0	7.2 5.5/8.8	6.4 4.8/7.6	4.8 3.1/6.6	2.9 2.1/4.0	1.6 0.8/2.6	0.8 0.3/1.5	4.7 4.1/5.4

**Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±9%**

Covid treatment for a 100000 patients (with 100000 patients)													
Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	1.4	3.2	6.0	7.9	8.3	8.4	8.1	6.9	5.0	2.9	1.6	0.8
	Min/Max	0.7/2.4	2.3/5.4	4.1/7.5	6.5/9.5	6.5/9.6	6.5/10.2	6.3/9.9	5.3/8.1	3.3/6.8	2.1/4.0	0.8/2.6	0.3/1.6
													5.1
													4.4/5.7

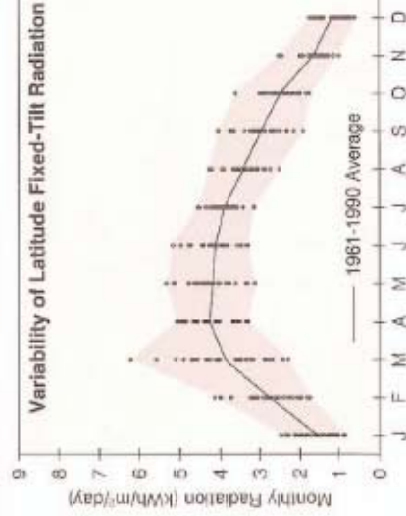
**Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±8%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year	
1-Axis, E-W Horiz Axis	Average Min/Max	0.9 0.3/1.8	1.8 0.9/3.8	2.9 1.6/4.2	3.5 2.5/4.8	3.6 2.5/4.5	3.6 2.3/5.0	3.5 2.3/4.7	3.0 1.9/3.9	2.4 1.2/3.6	1.5 0.7/2.4	0.9 0.3/1.7	0.6 0.2/1.2	2.4 1.9/2.9
1-Axis, N-S Horiz Axis	Average Min/Max	0.3 0.10/7	1.0 0.5/2.3	2.6 1.3/3.8	4.1 2.9/5.9	4.6 3.1/5.8	4.5 3.0/6.3	4.4 2.7/6.1	3.7 2.3/4.7	2.4 1.2/3.6	1.1 0.5/1.6	0.4 0.1/0.8	0.2 0.00/4	2.5 2.0/3.0
1-Axis, N-S Tilt=Latitude	Average Min/Max	0.9 0.3/1.8	2.0 1.0/4.3	3.9 2.1/5.5	5.0 3.5/7.1	5.0 3.4/6.3	4.7 3.0/6.5	4.7 2.9/6.4	4.3 2.7/5.5	3.3 1.7/4.9	1.8 0.9/2.8	1.0 0.3/1.8	0.5 0.2/1.2	3.1 2.5/3.7
2-Axis	Average Min/Max	1.0 0.3/2.0	2.1 1.0/4.4	3.9 2.1/5.6	5.1 3.6/7.2	5.3 3.6/6.6	5.1 3.3/7.1	5.0 3.1/6.8	4.4 2.7/5.7	3.3 1.7/4.9	1.8 0.9/2.9	1.0 0.3/1.9	0.6 0.2/1.3	3.2 2.6/3.9

**Average Climatic Conditions**

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-20.9	-15.9	-9.2	-0.7	6.5	11.8	14.1	11.9	6.6	-2.6	-14.9	-19.6	-2.7
Daily Minimum Temp	-25.5	-21.7	-16.3	-6.7	0.3	5.7	8.0	5.7	0.8	-6.9	-19.2	-23.8	-8.3
Daily Maximum Temp	-16.4	-10.2	-2.2	5.3	12.7	17.9	20.2	18.2	12.3	1.8	-10.7	-15.2	2.8
Record Minimum Temp	-51.1	-53.9	-44.4	-41.1	-15.0	-2.2	-1.7	-6.7	-15.0	-30.6	-42.2	-50.0	-53.9
Record Maximum Temp	7.8	7.8	10.0	19.4	29.4	32.2	32.8	30.0	23.3	18.3	8.9	6.7	32.8
HDD, Base 18.3°C	1218	960	854	572	367	197	131	198	353	648	998	1174	7671
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	73	73	67	63	58	59	65	68	71	77	78	75	69
Wind Speed (m/s)	1.6	2.2	2.7	3.4	3.7	3.8	3.4	3.5	3.2	2.8	1.8	1.8	2.8





## King Salmon, AK

WBAN NO. 25503

LATITUDE: 58.68° N  
LONGITUDE: 156.65° W  
ELEVATION: 15 meters  
MEAN PRESSURE: 1005 millibars

STATION TYPE: Secondary

Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.5 0.4/0.6	1.2 0.9/1.5	2.4 1.8/3.1	3.6 3.0/4.0	4.4 3.5/5.3	4.6 3.9/5.5	4.3 3.7/4.9	2.3 2.7/4.0	1.4 1.2/1.7	0.6 0.5/0.7	0.3 0.2/0.4	2.4 2.2/2.6
Latitude -15	Average Min/Max	1.4 0.8/2.1	2.5 1.6/3.7	3.7 2.3/5.8	4.4 3.4/5.2	4.5 3.4/5.7	4.5 3.6/5.7	4.3 3.5/5.0	3.6 2.7/4.5	2.4 2.0/4.0	1.5 0.9/2.2	1.0 0.5/1.5	3.1 2.6/3.4
Latitude	Average Min/Max	1.5 0.9/2.5	2.7 1.7/4.1	3.9 2.3/6.2	4.3 3.3/5.1	4.2 3.1/5.3	4.1 3.3/5.2	3.9 3.1/4.5	2.9 2.5/4.3	2.5 1.7/3.6	1.6 1.0/2.5	1.2 0.6/1.7	3.0 2.5/3.4
Latitude +15	Average Min/Max	1.6 0.9/2.6	2.8 1.8/4.3	3.8 2.2/6.3	3.9 3.0/4.7	3.7 2.7/4.7	3.6 2.8/4.5	3.4 2.7/3.9	3.0 2.2/3.8	2.8 1.7/3.8	1.7 1.0/2.7	1.3 0.6/1.9	2.8 2.3/3.3
90	Average Min/Max	1.6 0.9/2.6	2.7 1.7/4.1	3.5 2.0/5.9	3.4 2.5/4.3	3.0 2.2/3.7	2.8 2.2/3.5	2.7 2.2/3.1	2.4 1.8/3.2	2.3 1.5/3.4	1.7 1.0/2.7	1.3 0.6/1.9	2.5 2.0/2.9

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.8 0.5/1.3	2.0 1.3/3.0	3.7 2.2/5.9	5.0 4.1/7.6	5.7 4.7/7.3	5.7 4.7/7.3	4.2 3.1/5.4	3.1 2.1/4.3	2.0 1.5/2.9	1.0 0.6/1.5	0.6 0.3/0.8	3.3 2.8/3.7
Latitude -15	Average Min/Max	1.5 0.8/2.5	3.0 1.8/4.6	4.7 2.6/7.8	5.8 4.1/7.3	6.0 4.7/7.6	5.8 4.7/7.6	4.5 3.2/5.9	3.6 2.3/5.2	2.8 1.9/4.1	1.7 1.0/2.6	1.1 0.6/1.7	3.8 3.2/4.4
Latitude	Average Min/Max	1.7 0.9/2.7	3.2 1.9/4.9	4.8 2.6/8.1	5.7 4.0/7.2	5.8 4.0/7.9	5.6 3.9/7.3	4.3 3.0/5.7	3.6 2.2/5.2	2.9 2.0/4.3	1.8 1.0/2.8	1.3 0.6/1.9	3.8 3.1/4.4
Latitude +15	Average Min/Max	1.8 0.9/2.9	3.2 2.0/5.1	4.8 2.5/8.1	5.5 3.8/7.0	5.4 3.7/7.5	5.2 3.6/6.8	4.1 2.8/5.4	3.5 2.1/5.1	2.9 1.9/4.3	1.9 1.1/3.0	1.3 0.6/2.0	3.7 3.0/4.3

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	1.8 0.9/2.9	3.3 2.0/5.1	4.8 2.7/8.1	5.8 4.1/7.3	6.1 4.3/8.3	6.0 4.3/7.8	4.5 3.2/5.9	3.7 2.3/5.3	2.9 2.0/4.3	1.9 1.1/3.0	1.3 0.6/2.0	4.0 3.3/4.6

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 8\%$

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average Min/Max	1.1 0.4/2.2	1.9 0.7/3.6	2.3 0.8/4.7	2.4 1.4/3.5	2.3 1.0/3.8	2.1 1.0/3.5	1.5 0.7/2.5	1.4 0.5/2.6	1.5 0.8/2.6	1.1 0.5/2.0	0.9 0.3/1.5	1.7 1.2/2.1
1-Axis, N-S	Average Min/Max	0.5 0.2/1.0	1.2 0.4/2.4	2.1 0.8/4.4	2.8 1.6/4.3	3.0 1.4/4.9	2.6 1.2/4.3	1.9 0.9/3.0	1.5 0.6/2.7	1.1 0.6/1.9	0.5 0.2/1.0	0.3 0.1/0.6	1.7 1.2/2.0
1-Axis, N-S Tilt-Latitude	Average Min/Max	1.2 0.4/2.3	2.1 0.8/4.2	3.0 1.1/6.3	3.4 1.9/5.1	3.1 1.5/5.2	2.7 1.2/4.3	2.1 1.0/3.4	2.0 0.8/3.5	1.8 1.0/3.2	1.2 0.5/2.2	0.9 0.3/1.5	2.2 1.6/2.7
2-Axis	Average Min/Max	1.2 0.5/2.4	2.2 0.9/4.3	3.0 1.1/6.3	3.4 2.0/5.1	3.3 1.6/5.5	2.9 1.3/4.7	2.2 1.1/3.5	2.0 0.8/3.5	1.8 1.0/3.2	1.2 0.6/2.3	0.9 0.4/1.7	2.2 1.7/2.8

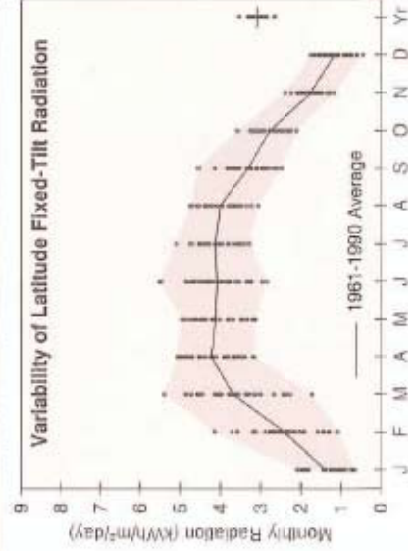
Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-9.5	-9.6	-5.3	-0.4	5.8	10.0	12.6	12.2	8.4	0.2	-5.4	-8.9	0.8
Daily Minimum Temp	-13.6	-14.1	-9.9	-4.8	1.1	5.2	8.0	8.0	4.3	-3.8	-9.4	-13.2	-3.5
Daily Maximum Temp	-5.5	-5.1	-0.7	3.9	10.5	14.8	17.2	16.3	12.6	4.3	-1.3	-4.8	5.2
Record Minimum Temp	-44.4	-40.6	-41.1	-26.1	-15.6	-1.7	0.6	-3.9	-9.4	-24.4	-33.3	-38.9	-44.4
Record Maximum Temp	11.7	13.9	13.3	18.3	25.0	31.1	30.0	28.9	23.3	19.4	13.3	8.9	31.1
HDD, Base 18.3°C	863	781	734	563	389	250	177	191	297	562	712	846	6364
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	76	73	73	72	70	74	78	80	79	79	81	77	76
Wind Speed (m/s)	4.9	5.1	5.1	5.0	5.0	4.9	4.5	4.7	4.7	4.6	4.7	4.9	4.8

**Kodiak, AK****WBAN NO. 25501**

LATITUDE: 57.75° N  
 LONGITUDE: 152.33° W  
 ELEVATION: 34 meters  
 MEAN PRESSURE: 1003 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day). Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.5 Min/Max 0.3/0.6	1.1 0.8/1.5	2.3 1.4/3.0	3.5 2.9/4.0	4.3 3.4/4.9	4.6 3.4/6.1	4.5 3.7/5.4	3.8 3.1/4.4	2.5 2.1/3.1	1.5 1.2/1.6	0.7 0.5/0.8	0.3 0.2/0.4	2.5 2.2/2.7
Latitude -15	Average 1.2 Min/Max 0.6/1.8	2.2 1.0/3.7	3.5 1.8/5.1	4.3 3.3/5.2	4.4 3.4/5.3	4.5 3.1/6.0	4.5 3.6/5.6	4.2 3.5/5.0	3.3 2.5/4.5	2.6 2.0/3.3	1.6 1.1/2.1	1.0 0.4/1.5	3.1 2.7/3.5
Latitude	Average 1.4 Min/Max 0.6/2.1	2.4 1.1/4.1	3.7 1.7/5.4	4.2 3.2/5.1	4.1 3.1/5.0	4.1 2.8/5.5	4.1 3.3/5.1	4.0 3.1/4.8	3.3 2.5/4.6	2.8 2.1/3.6	1.8 1.2/2.4	1.2 0.4/1.8	3.1 2.7/3.5
Latitude +15	Average 1.5 Min/Max 0.6/2.2	2.5 1.0/4.3	3.6 1.6/5.4	3.9 2.9/4.7	3.6 2.7/4.3	3.5 2.5/4.7	3.6 2.8/4.4	3.6 2.7/4.3	3.1 2.3/4.3	2.8 2.1/3.6	1.8 1.2/2.5	1.2 0.5/1.9	2.9 2.4/3.3
90	Average 1.4 Min/Max 0.6/2.2	2.4 1.0/4.1	3.3 1.4/5.1	3.3 2.4/4.1	2.9 2.2/3.4	2.7 1.9/3.6	2.8 2.3/3.5	2.9 2.2/3.5	2.7 2.0/3.8	2.0 1.9/3.4	1.8 1.1/2.5	1.2 0.4/1.9	2.5 2.1/2.9

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day). Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.8 Min/Max 0.4/1.1	1.8 0.9/3.0	3.5 1.6/5.2	5.0 3.6/6.0	5.6 3.9/7.0	5.8 3.7/8.7	5.8 4.3/7.5	5.1 3.6/6.4	3.5 2.6/4.9	2.3 1.8/2.8	1.1 0.8/1.4	0.6 0.3/0.8	3.4 2.9/3.8
Latitude -15	Average 1.4 Min/Max 0.6/2.1	2.6 1.1/4.6	4.5 1.9/6.7	5.7 4.0/7.0	5.9 4.0/7.4	5.9 3.6/9.0	5.9 4.4/7.9	5.5 3.9/7.0	4.2 3.0/6.0	3.2 2.4/4.1	1.8 1.2/2.5	1.1 0.4/1.7	4.0 3.4/4.5
Latitude	Average 1.5 Min/Max 0.7/2.3	2.8 1.1/4.9	4.6 1.9/6.9	5.7 3.9/6.9	5.7 3.8/7.1	5.7 3.4/8.7	5.7 4.2/7.6	5.4 3.7/6.8	4.2 3.0/6.0	3.3 2.5/4.3	2.0 1.3/2.7	1.2 0.5/1.9	4.0 3.4/4.5
Latitude +15	Average 1.6 Min/Max 0.7/2.4	2.8 1.1/5.1	4.5 1.8/6.9	5.4 3.7/6.7	5.3 3.5/6.7	5.3 3.2/8.3	5.3 3.9/7.2	4.0 3.5/6.5	3.0 2.9/5.9	3.3 2.5/4.3	2.0 1.3/2.8	1.3 0.5/2.0	3.8 3.2/4.4

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day). Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 1.6 Min/Max 0.7/2.4	2.8 1.1/5.1	4.6 1.9/6.9	5.8 4.0/7.0	6.0 4.1/7.5	6.2 3.8/9.4	6.1 4.5/8.3	5.6 3.9/7.1	4.2 3.0/6.1	3.3 2.5/4.3	2.0 1.3/2.8	1.3 0.5/2.0	4.1 3.5/4.7

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day). Uncertainty ±8%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average 1.0 Min/Max 0.3/1.6	1.5 0.3/3.5	2.2 0.6/3.6	2.5 1.5/3.5	2.3 0.9/3.4	2.3 0.9/4.5	2.3 1.3/3.5	2.3 1.2/3.3	1.8 1.0/3.0	1.8 1.3/2.7	1.3 0.7/2.0	0.9 0.3/1.5	1.9 1.5/2.2
1-Axis, N-S Horiz Axis	Average 0.4 Min/Max 0.1/0.8	1.0 0.2/2.4	2.1 0.5/3.4	3.0 1.8/4.1	3.0 1.1/4.3	3.0 1.2/5.9	3.0 1.6/4.6	2.9 1.4/4.3	2.0 1.1/3.3	1.4 0.9/2.0	0.6 0.4/1.0	0.3 0.1/0.6	1.9 1.5/2.2
1-Axis, N-S Tilt=Latitude	Average 1.0 Min/Max 0.3/1.7	1.8 0.4/4.1	3.0 0.8/4.8	3.5 2.1/4.9	3.2 1.2/4.6	3.0 1.2/5.9	3.1 1.7/4.7	3.2 1.6/4.8	2.5 1.5/4.3	2.2 1.5/3.3	1.4 0.7/2.1	0.9 0.3/1.5	2.4 1.9/2.8
2-Axis	Average 1.1 Min/Max 0.3/1.8	1.8 0.4/4.2	3.0 0.8/4.8	3.6 2.1/4.9	3.4 1.2/4.8	3.3 1.3/6.4	3.3 1.8/5.1	3.3 1.6/4.9	2.6 1.5/4.3	2.3 1.5/3.3	1.4 0.8/2.2	0.9 0.3/1.6	2.5 2.0/2.9

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-1.2	-0.8	0.5	3.1	6.4	9.8	12.4	12.9	10.0	4.8	1.3	-0.7	4.9
Daily Minimum Temp	-4.1	-3.9	-2.8	-0.3	3.1	6.4	9.0	9.1	6.3	1.2	-1.8	-3.8	1.6
Daily Maximum Temp	1.7	2.3	3.8	6.5	9.7	13.1	15.8	16.6	13.7	8.4	4.4	2.4	8.2
Record Minimum Temp	-26.7	-24.4	-21.1	-13.9	-6.7	-1.1	-2.8	2.2	-3.3	-12.2	-17.8	-18.3	-26.7
Record Maximum Temp	12.2	13.3	13.9	17.8	26.7	30.0	27.8	28.3	22.8	16.7	12.2	13.3	30.0
HDD, Base 18.3°C	604	537	553	458	371	257	183	169	250	418	510	589	4898
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	78	77	73	72	76	80	82	82	81	75	75	75	77
Wind Speed (m/s)	5.5	5.5	5.3	5.2	4.6	4.1	3.4	3.6	4.1	4.9	5.4	5.5	4.7

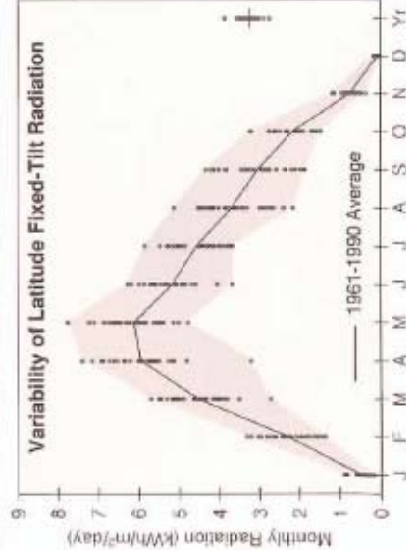


# Kotzebue, AK

WBAN NO. 26616

LATITUDE: 66.87° N  
LONGITUDE: 162.63° W  
ELEVATION: 5 meters  
MEAN PRESSURE: 1011 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.1 0.1/0.1	0.6 0.5/0.7	2.1 1.7/2.3	4.1 2.6/4.7	5.5 4.6/6.4	4.8 4.0/5.8	3.3 2.4/4.1	2.0 1.5/2.4	0.9 0.7/1.0	0.2 0.1/0.2	0.0 0.0/0.0	2.4 2.2/2.7
Latitude -15	Average Min/Max	0.4 0.2/0.8	2.1 1.3/3.0	4.3 2.7/5.4	6.4 3.3/7.3	5.7 4.1/6.8	5.0 4.1/6.4	3.9 2.3/5.4	3.1 1.9/4.3	2.1 1.4/3.0	0.7 0.3/1.0	0.1 0.0/0.2	3.3 2.8/3.9
Latitude	Average Min/Max	0.5 0.2/0.9	2.3 1.4/3.3	4.5 2.7/5.7	6.0 3.2/7.4	5.2 4.8/7.8	4.6 3.7/5.8	3.7 2.2/5.1	3.1 1.9/4.3	2.2 1.5/3.2	0.7 0.4/1.2	0.1 0.0/0.2	3.2 2.8/3.9
Latitude +15	Average Min/Max	0.5 0.2/0.9	2.3 1.4/3.4	4.5 2.7/5.7	5.7 3.0/7.1	4.4 3.2/5.6	3.9 3.2/5.0	3.3 1.9/4.6	2.9 1.7/4.1	2.2 1.5/3.3	0.8 0.4/1.2	0.1 0.0/0.2	3.0 2.6/3.6
90	Average Min/Max	0.5 0.2/0.9	2.3 1.4/3.4	4.4 2.6/5.5	5.4 2.9/6.7	4.0 2.8/5.1	3.5 2.8/4.5	3.0 1.7/4.2	2.7 1.6/3.9	2.1 1.4/3.2	0.8 0.4/1.2	0.1 0.0/0.2	2.8 2.4/3.4

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year	
0	Average	0.1	1.3	3.9	6.8	8.4	8.0	6.7	4.7	3.1	1.5	0.3	0.0	3.8
	Min/Max	0.1/0.3	0.8/1.8	2.3/4.8	3.5/8.6	6.3/11.4	5.3/9.8	5.0/9.3	2.7/6.7	1.9/4.5	1.0/2.2	0.2/0.5	0.0/0.0	3.1/4.6
Latitude -15	Average	0.4	2.4	5.5	8.4	9.5	8.7	7.3	5.3	3.9	2.4	0.7	0.1	4.6
	Min/Max	0.2/0.8	1.4/3.5	3.1/7.1	4.1/10.7	7.0/13.1	5.4/10.9	5.3/10.3	2.8/7.9	2.2/5.9	1.6/3.7	0.3/1.1	0.0/0.2	3.7/5.6
Latitude	Average	0.5	2.5	5.7	8.4	9.4	8.4	7.1	5.2	3.9	2.5	0.8	0.1	4.5
	Min/Max	0.2/0.9	1.5/3.8	3.2/7.3	4.1/10.7	6.8/13.1	5.2/10.6	5.1/10.0	2.6/7.7	2.2/5.9	1.6/3.8	0.4/1.3	0.0/0.2	3.7/5.6
Latitude +15	Average	0.5	2.6	5.7	8.2	9.0	8.0	6.7	4.9	3.8	2.5	0.8	0.1	4.4
	Min/Max	0.2/1.0	1.5/3.9	3.1/7.3	4.0/10.5	6.5/12.7	4.8/10.1	4.8/9.6	2.5/7.4	2.1/5.8	1.6/3.9	0.4/1.3	0.0/0.2	3.5/5.5

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	0.5 0.2/1.0	2.6 1.5/3.9	5.7 3.2/7.3	8.4 4.1/10.7	9.6 7.1/13.3	9.0 5.7/11.3	7.6 5.5/10.6	4.0 2.2/5.9	2.5 1.6/3.9	0.8 0.4/1.3	0.1 0.0/0.2	4.7 3.8/5.8

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±8%

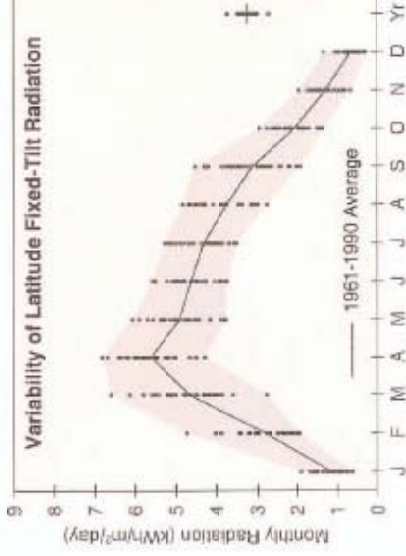
Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average Min/Max	0.4 0.1/0.9	1.6 0.7/2.8	2.9 1.0/4.2	3.5 1.2/5.1	4.0 2.5/6.5	4.1 1.8/5.8	2.2 0.6/3.8	1.9 0.7/3.2	1.4 0.7/2.5	0.5 0.2/1.0	0.1 0.0/0.2	2.2 1.5/3.0
1-Axis, N-S	Average Min/Max	0.1 0.0/0.2	0.8 0.3/1.4	2.4 0.7/3.5	4.1 1.4/5.9	5.0 3.0/8.3	5.0 2.1/6.9	2.6 0.8/4.6	1.8 0.6/3.2	0.9 0.4/1.6	0.2 0.0/0.3	0.0 0.0/0.0	2.2 1.5/3.1
1-Axis, N-S Tilt=Latitude	Average Min/Max	0.4 0.1/0.9	1.8 0.8/3.1	3.8 1.2/5.4	5.1 1.7/7.4	5.5 3.3/9.2	5.3 2.3/7.4	4.3 2.7/7.3	2.6 0.9/4.5	1.7 0.9/3.0	0.6 0.2/1.0	0.1 0.0/0.2	2.9 1.9/3.9
2-Axis	Average Min/Max	0.4 0.1/0.9	1.8 0.8/3.2	3.8 1.2/5.4	5.2 1.8/7.6	5.9 3.5/9.7	5.8 2.5/8.1	4.7 2.9/7.9	2.6 0.9/4.5	1.7 0.9/3.1	0.6 0.2/1.1	0.1 0.0/0.2	3.0 2.0/4.1

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-18.3	-20.4	-17.6	-11.5	-0.4	6.6	12.1	11.2	5.6	-5.1	-13.4	-18.3	-5.8
Daily Minimum Temp	-21.9	-24.4	-22.2	-16.5	-4.2	3.2	9.2	8.5	2.8	-7.7	-16.4	-21.9	-9.3
Daily Maximum Temp	-14.7	-16.5	-12.9	-6.5	3.3	9.8	15.1	13.9	8.3	-2.4	-10.5	-14.7	-2.3
Record Minimum Temp	-45.0	-46.7	-44.4	-42.2	-27.8	-6.7	-1.1	-1.1	-9.4	-28.3	-37.8	-43.9	-46.7
Record Maximum Temp	3.9	4.4	3.9	8.9	23.3	29.4	29.4	26.7	20.6	10.6	3.3	2.8	29.4
HDD, Base 18.3°C	1137	1086	1113	895	582	353	196	226	383	725	953	1135	8784
CDD, Base 18.3°C	0	0	0	0	0	0	3	4	0	0	0	0	7
Relative Humidity (%)	72	70	71	76	81	82	81	81	79	79	76	74	77
Wind Speed (m/s)	6.2	5.5	5.1	5.3	5.2	5.4	5.6	5.6	6.0	5.9	6.4	6.3	5.7

WBAN NO. 26510

LATITUDE: 62.97° N  
LONGITUDE: 155.62° W  
ELEVATION: 103 meters  
MEAN PRESSURE: 997 millibars  
STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.3 Min/Max 0.2/0.3	Average 1.0 Min/Max 0.8/1.2	Average 2.4 Min/Max 1.9/2.9	Average 4.2 Min/Max 3.5/4.7	Average 4.8 Min/Max 3.9/5.7	Average 5.1 Min/Max 4.3/5.9	Average 4.6 Min/Max 4.0/5.4	Average 3.5 Min/Max 2.8/4.1	Average 2.2 Min/Max 1.7/2.8	Average 1.1 Min/Max 0.9/1.3	Average 0.4 Min/Max 0.3/0.4	Average 0.1 Min/Max 0.1/0.1	Average 2.5 Min/Max 2.3/2.8
Latitude -15	Average 1.0 Min/Max 0.6/1.6	Average 2.5 Min/Max 1.8/4.2	Average 4.4 Min/Max 2.7/6.2	Average 5.6 Min/Max 4.4/6.8	Average 5.3 Min/Max 4.1/6.1	Average 5.1 Min/Max 4.1/6.1	Average 4.0 Min/Max 3.0/5.1	Average 3.1 Min/Max 2.0/4.5	Average 2.0 Min/Max 1.3/2.8	Average 1.1 Min/Max 0.6/1.7	Average 0.6 Min/Max 0.3/1.1	Average 0.3 Min/Max 0.2/0.3	Average 3.3 Min/Max 2.8/3.8
Latitude	Average 1.2 Min/Max 0.6/1.9	Average 2.8 Min/Max 1.9/4.7	Average 4.7 Min/Max 2.8/6.6	Average 5.6 Min/Max 4.3/6.8	Average 4.9 Min/Max 3.7/5.6	Average 4.6 Min/Max 3.7/5.6	Average 3.7 Min/Max 2.8/4.8	Average 3.1 Min/Max 1.9/4.5	Average 2.1 Min/Max 1.3/2.9	Average 1.3 Min/Max 0.7/1.9	Average 0.6 Min/Max 0.3/1.3	Average 0.2 Min/Max 0.1/0.2	Average 3.2 Min/Max 2.7/3.7
Latitude +15	Average 1.2 Min/Max 0.6/2.0	Average 2.9 Min/Max 2.0/4.9	Average 4.6 Min/Max 2.7/6.6	Average 5.4 Min/Max 4.0/6.6	Average 4.4 Min/Max 3.3/5.4	Average 4.0 Min/Max 3.2/4.8	Average 3.3 Min/Max 2.4/4.3	Average 2.9 Min/Max 1.7/4.3	Average 2.1 Min/Max 1.3/2.9	Average 1.3 Min/Max 0.7/2.0	Average 0.7 Min/Max 0.3/1.4	Average 0.3 Min/Max 0.1/0.3	Average 3.0 Min/Max 2.5/3.5
90	Average 1.2 Min/Max 0.6/2.0	Average 2.8 Min/Max 2.0/4.9	Average 4.5 Min/Max 2.6/6.4	Average 5.0 Min/Max 3.6/6.1	Average 3.8 Min/Max 2.8/4.8	Average 3.3 Min/Max 2.7/4.0	Average 2.9 Min/Max 2.1/3.8	Average 2.7 Min/Max 1.6/3.9	Average 2.0 Min/Max 1.2/2.8	Average 1.3 Min/Max 0.7/2.0	Average 0.7 Min/Max 0.3/1.4	Average 0.2 Min/Max 0.1/0.2	Average 2.8 Min/Max 2.3/3.2

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.5 Min/Max 0.3/0.8	Average 1.8 Min/Max 1.3/3.0	Average 2.8 Min/Max 2.5/5.9	Average 4.2 Min/Max 4.9/7.9	Average 6.9 Min/Max 5.1/9.1	Average 6.9 Min/Max 5.1/8.4	Average 6.2 Min/Max 4.8/7.9	Average 4.7 Min/Max 3.6/6.2	Average 3.2 Min/Max 2.0/4.8	Average 1.6 Min/Max 1.1/2.2	Average 0.7 Min/Max 0.4/1.0	Average 0.2 Min/Max 0.1/0.4	Average 3.6 Min/Max 3.0/4.3
Latitude -15	Average 1.1 Min/Max 0.6/1.8	Average 3.0 Min/Max 2.0/5.2	Average 5.7 Min/Max 3.1/8.3	Average 7.7 Min/Max 5.6/9.6	Average 7.5 Min/Max 5.5/10.1	Average 7.2 Min/Max 5.2/9.0	Average 6.6 Min/Max 4.9/8.5	Average 5.3 Min/Max 3.8/7.1	Average 4.0 Min/Max 2.2/6.1	Average 2.3 Min/Max 1.5/3.3	Average 1.3 Min/Max 0.6/1.9	Average 0.6 Min/Max 0.3/1.2	Average 4.3 Min/Max 3.5/5.2
Latitude	Average 1.2 Min/Max 0.6/2.0	Average 3.2 Min/Max 2.3/5.6	Average 5.9 Min/Max 3.2/8.6	Average 7.7 Min/Max 5.6/9.6	Average 7.3 Min/Max 5.3/9.9	Average 7.0 Min/Max 4.9/8.7	Average 6.3 Min/Max 4.7/8.2	Average 5.1 Min/Max 3.7/6.9	Average 4.0 Min/Max 2.2/6.2	Average 2.4 Min/Max 1.5/3.5	Average 1.4 Min/Max 0.7/2.1	Average 0.7 Min/Max 0.3/1.4	Average 4.3 Min/Max 3.5/5.2
Latitude +15	Average 1.3 Min/Max 0.7/2.2	Average 3.3 Min/Max 2.2/5.7	Average 5.9 Min/Max 3.2/8.6	Average 7.5 Min/Max 5.5/9.4	Average 7.0 Min/Max 5.0/9.4	Average 6.6 Min/Max 4.6/8.3	Average 5.9 Min/Max 4.4/7.8	Average 4.9 Min/Max 3.4/6.6	Average 3.8 Min/Max 2.0/6.0	Average 2.4 Min/Max 1.5/3.5	Average 1.4 Min/Max 0.7/2.2	Average 0.7 Min/Max 0.3/1.5	Average 4.2 Min/Max 3.3/5.1

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 1.3 Min/Max 0.7/2.2	Average 3.3 Min/Max 2.2/5.7	Average 5.9 Min/Max 3.2/8.6	Average 7.7 Min/Max 5.7/9.6	Average 7.7 Min/Max 5.6/10.3	Average 7.5 Min/Max 5.4/9.4	Average 6.8 Min/Max 5.1/8.7	Average 5.3 Min/Max 3.8/7.2	Average 4.0 Min/Max 2.2/6.2	Average 2.4 Min/Max 1.5/3.5	Average 1.4 Min/Max 0.7/2.2	Average 0.7 Min/Max 0.3/1.5	Average 4.5 Min/Max 3.6/5.4

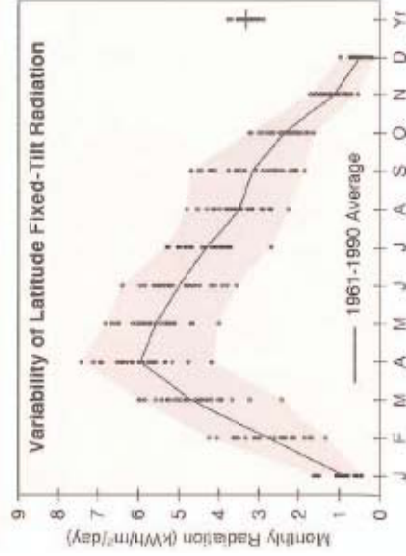
Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±8%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average 0.9 Min/Max 0.3/1.7	Average 1.9 Min/Max 0.9/4.1	Average 2.8 Min/Max 1.0/5.1	Average 3.1 Min/Max 1.5/4.4	Average 3.2 Min/Max 1.8/5.2	Average 3.1 Min/Max 1.5/4.2	Average 2.7 Min/Max 1.4/4.0	Average 2.1 Min/Max 1.1/3.3	Average 1.8 Min/Max 0.5/3.2	Average 1.1 Min/Max 0.5/2.1	Average 0.8 Min/Max 0.3/1.5	Average 0.5 Min/Max 0.2/1.3	Average 2.0 Min/Max 1.4/2.6
1-Axis, N-S	Average 0.3 Min/Max 0.1/0.6	Average 1.1 Min/Max 0.5/2.4	Average 2.5 Min/Max 0.8/4.5	Average 3.6 Min/Max 1.7/5.1	Average 4.1 Min/Max 2.4/6.7	Average 3.9 Min/Max 1.9/5.3	Average 3.4 Min/Max 1.8/5.0	Average 2.5 Min/Max 1.5/3.9	Average 1.8 Min/Max 0.5/3.4	Average 0.8 Min/Max 0.3/1.5	Average 0.3 Min/Max 0.1/0.6	Average 0.1 Min/Max 0.0/0.3	Average 2.0 Min/Max 1.4/2.8
1-Axis, N-S	Average 0.9 Min/Max 0.3/1.7	Average 2.1 Min/Max 1.0/4.7	Average 3.8 Min/Max 1.2/6.7	Average 4.5 Min/Max 2.1/6.3	Average 4.4 Min/Max 2.6/7.3	Average 4.0 Min/Max 2.0/5.5	Average 3.5 Min/Max 1.9/5.3	Average 2.9 Min/Max 1.7/4.6	Average 2.5 Min/Max 0.7/4.6	Average 1.4 Min/Max 0.6/2.6	Average 0.9 Min/Max 0.3/1.6	Average 0.5 Min/Max 0.1/1.2	Average 2.6 Min/Max 1.8/3.5
2-Axis	Average 0.9 Min/Max 0.3/1.8	Average 2.2 Min/Max 1.0/4.8	Average 3.8 Min/Max 1.2/6.7	Average 4.5 Min/Max 2.1/6.4	Average 4.7 Min/Max 2.7/7.7	Average 4.4 Min/Max 2.2/6.0	Average 3.8 Min/Max 2.1/5.7	Average 3.0 Min/Max 1.8/4.7	Average 2.5 Min/Max 0.7/4.6	Average 1.4 Min/Max 0.6/2.6	Average 0.9 Min/Max 0.3/1.7	Average 0.5 Min/Max 0.2/1.3	Average 2.7 Min/Max 1.9/3.6

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-22.6	-19.2	-12.1	-3.1	6.9	12.9	14.8	12.4	6.8	-4.1	-15.3	-21.1	-3.6
Daily Minimum Temp	-27.7	-25.7	-19.4	-8.9	1.4	7.3	9.4	7.2	1.9	-7.8	-19.8	-25.9	-9.0
Daily Maximum Temp	-17.6	-12.8	-4.8	2.8	12.5	18.6	20.2	17.5	11.6	-0.4	-10.9	-16.3	1.7
Record Minimum Temp	-59.4	-53.3	-46.1	-40.0	-18.9	-1.1	0.6	-3.9	-14.4	-33.3	-47.2	-55.0	-59.4
Record Maximum Temp	12.2	12.8	10.6	19.4	27.2	32.2	31.7	31.7	24.4	15.0	9.4	9.4	32.2
HDD, Base 18.3°C	1269	1052	944	642	353	162	115	188	347	694	1010	1223	7998
CDD, Base 18.3°C	0	0	0	0	0	0	7	3	0	0	0	0	10
Relative Humidity (%)	72	69	64	62	59	63	70	75	74	78	77	74	70
Wind Speed (m/s)	1.4	2.0	2.5	3.1	3.1	3.0	2.8	2.8	2.8	2.6	1.8	1.5	2.5





**Nome, AK**

**WBAN NO. 26617**

LATITUDE: 64.50° N  
LONGITUDE: 165.43° W  
ELEVATION: 7 meters  
MEAN PRESSURE: 1009 millibars

STATION TYPE: Secondary

**Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty ±9%**

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.2 0.0/2	0.8 0.7/1.0	2.3 1.7/2.7	4.3 3.6/4.8	5.3 4.0/6.2	5.5 4.2/6.8	4.6 3.3/5.5	2.1 1.6/2.8	1.0 0.8/1.2	0.3 0.2/0.3	0.1 0.0/0.1	2.5 2.3/2.7
Latitude -15	Average Min/Max	0.8 0.4/1.4	2.5 1.3/3.8	4.5 2.4/5.6	5.9 4.3/7.1	5.5 3.9/7.0	5.5 3.9/7.0	4.7 3.0/5.8	3.2 2.5/5.0	2.2 1.6/3.0	1.0 0.5/1.5	0.4 0.2/0.8	3.4 2.9/3.8
Latitude	Average Min/Max	0.9 0.4/1.6	2.8 1.4/4.2	4.7 2.4/6.0	5.9 4.0/7.4	5.6 4.0/6.8	5.0 3.5/6.4	4.3 2.7/5.3	3.2 2.3/4.8	2.4 1.6/3.2	1.1 0.5/1.7	0.5 0.2/1.0	3.3 2.9/3.8
Latitude +15	Average Min/Max	0.9 0.4/1.8	2.9 1.4/4.4	4.7 2.4/6.0	5.6 4.0/7.1	5.0 3.6/6.3	4.3 3.0/5.4	3.7 2.3/4.6	3.1 2.0/4.3	2.4 1.6/3.2	1.2 0.6/1.8	0.5 0.2/1.0	3.1 2.7/3.5
90	Average Min/Max	0.9 0.4/1.8	2.8 1.3/4.4	4.5 2.3/5.8	5.3 3.7/6.7	4.5 3.2/5.8	3.7 2.6/4.7	3.2 2.0/4.0	2.7 1.7/3.8	2.3 1.5/3.1	1.2 0.5/1.8	0.5 0.2/1.1	2.9 2.5/3.2

**Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty ±9%**

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.3 0.2/0.6	1.7 1.0/2.6	4.2 2.3/5.3	6.9 4.6/8.8	7.9 5.3/10.2	7.8 4.8/10.6	6.3 3.8/8.4	3.3 2.8/6.2	1.8 1.2/2.3	0.5 0.3/0.8	0.1 0.1/0.3	3.8 3.2/4.4
Latitude -15	Average Min/Max	0.8 0.4/1.6	3.0 1.4/4.6	5.8 2.8/7.5	8.3 5.2/10.8	8.7 5.6/11.4	8.3 4.8/11.4	6.7 3.8/9.0	4.1 2.9/7.1	2.7 1.8/3.7	1.1 0.5/1.7	0.4 0.2/0.9	4.6 3.8/5.4
Latitude	Average Min/Max	0.9 0.4/1.8	3.2 1.5/4.9	5.9 2.8/7.7	8.3 5.1/10.8	8.5 5.5/11.2	8.0 4.6/11.1	6.4 3.6/8.8	4.1 2.8/6.4	2.8 1.9/3.9	1.2 0.6/1.9	0.5 0.2/1.0	4.6 3.8/5.4
Latitude +15	Average Min/Max	1.0 0.5/1.9	3.2 1.5/5.1	5.9 2.8/7.7	8.1 5.0/10.6	8.1 4.3/10.6	7.6 4.3/10.6	6.1 3.3/8.4	4.0 2.6/6.6	2.8 1.8/3.9	1.3 0.6/1.9	0.5 0.2/1.1	4.4 3.7/5.3

**Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±9%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	1.0 0.5/1.9	3.2 1.5/5.1	5.9 2.8/7.7	8.4 5.2/10.8	8.8 5.8/11.7	8.6 5.1/11.9	6.9 3.9/9.4	4.1 2.2/6.4	2.8 1.9/3.9	1.3 0.6/2.0	0.5 0.2/1.1	4.7 4.0/5.6

**Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±8%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average Min/Max	0.7 0.2/1.5	2.0 0.4/3.6	3.0 0.7/4.4	3.5 1.1/5.3	3.8 1.3/6.4	4.0 1.4/6.4	2.9 0.9/4.5	1.9 0.8/3.5	1.6 0.9/2.5	0.8 0.2/1.4	0.5 0.2/1.0	2.7 1.6/2.9
Horiz Axis	Average Min/Max	0.2 0.1/0.5	1.1 0.2/2.0	2.6 0.6/4.0	4.2 1.2/6.3	4.8 1.6/8.1	5.0 1.7/8.0	3.6 1.3/5.8	2.4 0.9/4.3	2.0 0.8/3.6	1.1 0.1/0.6	0.3 0.0/0.2	2.3 1.6/3.0
1-Axis, N-S	Average Min/Max	0.7 0.2/1.5	2.2 0.5/4.1	3.9 0.9/6.0	5.1 1.5/7.7	5.3 1.8/8.9	5.2 1.8/8.4	3.8 1.3/6.2	2.7 1.1/4.8	2.7 1.0/4.8	1.9 0.8/3.1	0.8 0.2/1.5	2.9 2.1/3.8
2-Axis	Average Min/Max	0.7 0.2/1.6	2.3 0.5/4.2	3.9 0.9/6.0	5.2 1.5/7.8	5.6 1.9/9.4	5.7 1.9/9.1	4.1 1.5/6.6	2.7 1.1/5.0	2.7 1.0/4.9	2.0 0.9/3.1	0.9 0.2/1.5	3.0 2.2/4.0

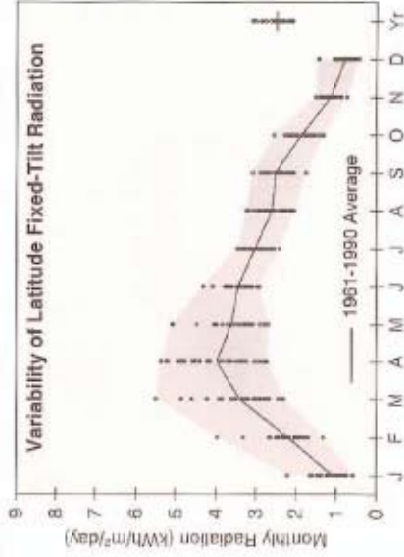
**Average Climatic Conditions**

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-13.9	-15.6	-13.0	-8.0	2.0	7.7	10.8	10.1	5.8	-2.2	-8.9	-13.7	-3.2
Daily Minimum Temp	-18.2	-20.3	-17.9	-12.4	-1.6	3.8	7.3	6.7	2.4	-5.4	-12.6	-18.1	-7.2
Daily Maximum Temp	-9.6	-11.0	-8.1	-3.6	5.6	11.6	14.3	13.4	9.3	0.9	-5.3	-9.4	0.7
Record Minimum Temp	-47.8	-41.1	-43.3	-34.4	-23.9	-5.0	-0.6	-2.8	-9.4	-23.3	-39.4	-40.6	-47.8
Record Maximum Temp	6.1	8.9	6.1	10.6	25.6	27.2	30.0	27.2	21.7	15.0	7.2	6.1	30.0
HDD, Base 18.3°C	999	951	971	790	506	318	235	255	375	637	818	994	7849
CHDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	72	69	71	74	74	74	79	80	75	74	74	72	74
Wind Speed (m/s)	5.2	4.6	4.5	4.7	4.6	4.5	4.5	4.9	5.2	4.9	5.1	5.0	4.8

# St Paul Is., AK

WBAN NO. 25713

LATITUDE: 57.15° N  
LONGITUDE: 170.22° W  
ELEVATION: 7 meters  
MEAN PRESSURE: 1006 millibars  
STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.5 0.4/0.6	1.2 0.9/1.6	2.4 1.9/3.1	3.5 3.2/5.1	4.0 3.5/4.7	3.6 3.0/3.9	2.9 2.4/3.4	2.2 1.8/2.4	1.3 1.1/1.5	0.6 0.5/0.7	0.4 0.3/0.5	2.2 2.0/2.5
Latitude -15	Average Min/Max	1.0 0.6/1.9	2.0 1.3/3.6	3.3 2.3/5.2	4.1 2.9/5.4	3.9 3.0/5.3	3.8 3.2/4.7	2.8 2.3/3.5	2.6 1.9/3.1	1.8 1.3/2.4	1.1 0.7/1.4	0.7 0.4/1.3	2.5 2.2/3.1
Latitude	Average Min/Max	1.1 0.6/2.2	2.2 1.3/4.0	3.4 2.3/5.5	4.0 2.7/5.4	3.6 2.7/5.1	3.4 2.9/4.3	2.6 2.0/3.2	2.5 1.8/3.1	1.9 1.3/2.5	1.1 0.7/1.5	0.8 0.4/1.4	2.5 2.1/3.1
Latitude +15	Average Min/Max	1.1 0.6/2.3	2.2 1.3/4.1	3.3 2.2/5.5	3.7 2.5/5.2	3.0 2.3/4.8	2.6 2.1/3.0	2.3 1.8/2.9	2.3 1.6/2.9	1.8 1.3/2.5	1.2 0.7/1.6	0.8 0.4/1.5	2.3 1.9/2.9
90	Average Min/Max	1.1 0.5/2.3	2.1 1.2/4.0	3.1 1.9/5.2	2.6 2.0/4.6	2.3 1.9/4.2	2.3 2.0/2.9	1.9 1.6/2.4	2.0 1.4/2.3	1.7 1.1/2.3	1.1 0.7/1.5	0.8 0.4/1.6	2.0 1.6/2.6

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.7 0.4/1.3	1.7 1.1/3.0	3.3 2.3/5.2	4.5 3.2/6.5	4.4 3.5/5.4	3.7 2.8/4.3	3.0 2.3/3.8	2.6 1.8/3.2	1.6 1.2/2.1	0.8 0.5/1.0	0.5 0.3/0.7	2.6 2.2/3.2
Latitude -15	Average Min/Max	1.1 0.6/2.2	2.3 1.4/4.4	4.0 2.7/6.8	4.9 3.2/6.9	4.3 3.4/5.6	3.6 2.7/4.4	3.1 2.3/4.0	3.0 1.9/3.8	2.0 1.4/2.8	1.1 0.7/1.5	0.8 0.4/1.4	2.9 2.4/3.7
Latitude	Average Min/Max	1.2 0.6/2.4	2.5 1.4/4.7	4.1 2.7/7.0	4.9 3.1/6.9	4.1 3.0/6.8	3.4 2.5/4.2	2.9 2.2/3.8	2.9 1.9/3.8	2.1 1.4/3.0	1.2 0.7/1.6	0.8 0.4/1.5	2.9 2.4/3.7
Latitude +15	Average Min/Max	1.2 0.6/2.6	2.5 1.4/4.8	4.0 2.6/7.0	4.7 2.9/6.8	3.8 2.7/6.5	3.1 2.3/3.9	2.7 2.0/3.6	2.8 1.8/3.6	2.1 1.4/2.9	1.2 0.7/1.7	0.9 0.4/1.6	2.8 2.3/3.6

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±9%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	1.2 0.6/2.6	2.5 1.5/4.8	4.1 2.7/7.0	5.0 3.3/7.0	4.7 3.3/5.8	3.8 2.8/4.6	3.1 2.4/4.0	3.0 1.9/3.8	2.1 1.5/3.0	1.3 0.8/1.7	0.9 0.4/1.7	3.0 2.5/3.9

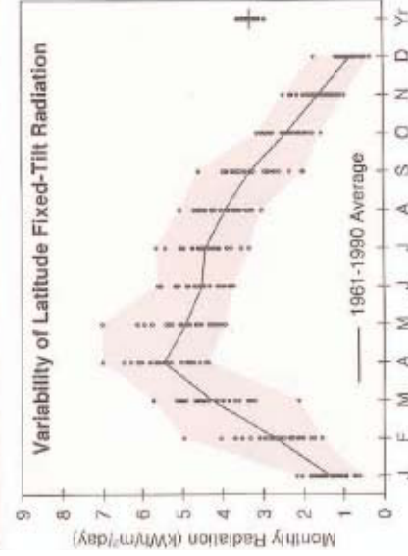
Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty ±8%

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average Min/Max	0.5 0.1/1.7	1.1 0.5/2.8	1.5 0.8/3.6	1.4 0.6/2.5	1.2 0.4/2.4	1.1 0.2/2.2	0.7 0.2/1.4	1.0 0.4/1.5	0.9 0.4/1.5	0.6 0.3/0.9	0.4 0.1/0.9	0.9 0.7/1.4
1-Axis, N-S Horiz Axis	Average Min/Max	0.2 0.1/0.8	0.7 0.4/2.0	1.3 0.7/3.3	1.5 0.7/3.0	1.3 0.6/3.0	1.3 0.7/2.5	0.8 0.2/1.7	1.0 0.4/1.6	0.6 0.3/1.1	0.3 0.1/0.5	0.2 0.1/0.4	0.9 0.7/1.4
1-Axis, N-S Tilt=Latitude	Average Min/Max	0.6 0.1/1.8	1.2 0.6/3.3	1.9 1.0/4.7	2.0 0.9/3.5	1.5 0.6/3.2	1.3 0.2/2.6	0.8 0.2/1.8	1.3 0.3/1.5	1.0 0.6/1.8	0.6 0.3/1.0	0.4 0.1/0.9	1.1 0.9/1.8
2-Axis	Average Min/Max	0.6 0.1/1.9	1.3 0.6/3.4	1.9 1.0/4.7	2.0 0.9/3.5	1.4 0.6/3.4	1.3 0.3/2.8	0.9 0.2/1.9	1.6 0.3/1.6	1.1 0.6/1.8	0.6 0.3/1.0	0.4 0.1/1.0	1.2 0.9/1.9

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-3.0	-5.3	-4.3	-2.1	1.8	5.3	7.8	8.7	7.0	3.2	0.6	-1.7	1.5
Daily Minimum Temp	-5.3	-7.8	-7.0	-4.5	-0.4	2.8	5.8	6.9	4.6	0.9	-1.7	-4.0	-0.8
Daily Maximum Temp	-0.7	-2.8	-1.7	0.4	4.1	7.7	9.8	10.6	9.3	5.6	2.8	0.7	3.8
Record Minimum Temp	-32.2	-26.7	-28.3	-22.2	-13.3	-8.9	-2.2	-1.7	-3.9	-11.1	-15.6	-20.6	-32.2
Record Maximum Temp	8.9	6.7	10.0	8.9	14.4	16.7	17.2	18.9	16.1	12.2	10.0	11.1	18.9
HDD, Base 18.3°C	661	663	703	612	513	392	326	298	340	468	533	620	6128
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	84	84	85	85	87	90	93	93	88	82	82	83	86
Wind Speed (m/s)	8.6	8.9	8.3	8.0	6.8	6.1	5.5	6.1	7.0	8.0	8.4	8.8	7.5





**Talkeetna, AK**

**WBAN NO. 26528**

LATITUDE: 62.30° N  
LONGITUDE: 150.10° W  
ELEVATION: 105 meters  
MEAN PRESSURE: 996 millibars

STATION TYPE: Secondary

**Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$**

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.30 Min/Max 0.30/3.0	1.0 0.8/1.3	2.3 1.6/2.7	4.1 3.4/4.7	4.8 4.0/6.2	5.0 4.3/6.0	4.7 3.9/5.7	3.6 3.0/4.3	2.3 1.7/2.8	1.2 1.0/1.3	0.4 0.4/0.6	0.2 0.1/0.2	2.5 2.3/2.7
Latitude -15	Average 1.2 Min/Max 0.6/1.9	2.5 1.5/4.4	4.1 2.1/5.4	5.5 4.4/6.9	5.2 4.3/7.3	5.0 4.1/6.1	4.8 3.7/6.1	4.2 3.3/5.3	3.3 2.0/4.5	2.3 1.5/2.9	1.4 0.9/2.2	0.7 0.3/1.5	3.3 3.0/3.6
Latitude	Average 1.3 Min/Max 0.6/2.4	2.7 1.5/5.0	4.3 2.1/5.7	5.4 4.3/7.0	4.9 3.9/7.0	4.5 3.7/5.6	4.4 3.3/5.6	3.9 3.0/5.1	3.3 2.0/4.6	2.4 1.5/3.1	1.6 1.0/2.5	0.8 0.3/1.7	3.3 2.9/3.6
Latitude +15	Average 1.4 Min/Max 0.6/2.3	2.8 1.6/5.2	4.2 2.0/5.7	5.2 4.0/6.7	4.4 3.4/6.4	3.9 3.2/4.8	3.8 2.9/4.9	3.5 2.7/4.5	3.1 1.8/4.3	2.4 1.5/3.2	1.7 1.0/2.6	0.9 0.3/1.9	3.1 2.7/3.4
90	Average 1.4 Min/Max 0.6/2.3	2.7 1.5/5.1	4.0 1.8/5.5	4.8 3.5/6.2	3.8 2.9/5.8	3.2 2.7/4.0	3.2 2.4/4.1	3.0 2.3/3.9	2.8 1.6/4.0	2.3 1.4/3.1	1.7 1.0/2.6	0.9 0.3/1.9	2.8 2.5/3.1

**Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$**

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average 0.6 Min/Max 0.3/0.9	1.8 1.2/3.2	3.9 2.0/5.2	6.3 5.0/8.5	6.8 5.3/9.4	6.5 5.2/8.6	6.2 4.7/8.4	4.9 3.6/6.6	3.4 2.0/4.6	1.9 1.3/2.3	0.9 0.6/1.3	0.3 0.1/0.6	3.6 3.2/4.1
Latitude -15	Average 1.3 Min/Max 0.6/2.1	2.9 1.6/5.5	5.2 2.4/7.2	7.5 5.8/10.3	7.3 5.7/10.5	6.8 5.3/9.1	6.6 4.7/9.0	5.5 3.9/7.5	4.2 2.3/5.9	2.7 1.7/3.5	1.6 1.0/2.5	0.8 0.3/1.6	4.4 3.8/4.9
Latitude	Average 1.4 Min/Max 0.6/2.4	3.1 1.7/5.9	5.3 2.4/7.4	7.5 5.8/10.3	7.1 5.5/10.4	6.6 5.1/8.8	6.3 4.4/8.8	5.3 3.7/7.3	4.2 2.3/6.0	2.8 1.7/3.7	1.8 1.0/2.8	0.9 0.3/1.8	4.4 3.8/4.9
Latitude +15	Average 1.5 Min/Max 0.7/2.5	3.2 1.7/6.1	5.3 2.3/7.4	7.3 5.6/10.1	6.8 5.2/10.0	6.2 4.7/8.3	5.9 4.1/8.3	5.0 3.5/7.0	4.1 2.2/5.8	2.8 1.7/3.7	1.8 1.1/2.9	0.9 0.4/2.0	4.2 3.6/4.7

**Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 9\%$**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average 1.5 Min/Max 0.7/2.5	3.2 1.7/6.1	5.3 2.5/7.4	7.5 5.9/10.3	7.5 5.8/10.6	7.1 5.5/9.4	6.8 4.8/9.3	5.5 3.9/7.6	4.2 2.4/6.0	2.8 1.8/3.7	1.8 1.1/2.9	0.9 0.4/2.0	4.5 3.9/5.1

**Direct Beam Solar Radiation for Concentrating Collectors (kWh/m<sup>2</sup>/day), Uncertainty  $\pm 8\%$**

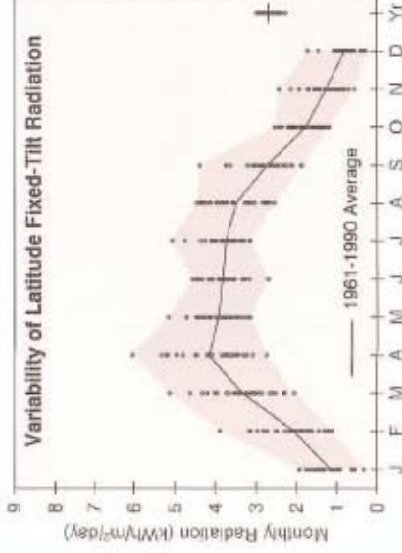
Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average 1.0 Min/Max 0.2/1.9	1.8 0.4/4.4	2.6 0.9/4.2	3.1 1.7/5.1	3.1 1.5/4.8	2.9 1.6/4.5	2.8 1.2/4.5	2.3 1.2/3.7	2.0 0.8/3.2	1.5 0.6/2.3	1.2 0.4/2.0	0.7 0.2/1.7	2.1 1.7/2.4
1-Axis, N-S	Average 0.4 Min/Max 0.1/0.7	1.1 0.3/2.7	2.3 0.8/3.8	3.6 2.0/6.2	3.9 1.8/6.0	3.6 2.1/5.7	3.4 1.6/5.6	2.7 1.4/4.5	2.0 0.8/3.2	1.0 0.4/1.5	0.5 0.2/0.9	0.2 0.1/0.5	2.1 1.6/2.5
1-Axis, N-S	Average 1.0 Min/Max 0.2/2.0	2.1 0.5/5.1	3.4 1.2/5.6	4.4 2.3/7.5	4.3 2.0/6.5	3.7 2.1/5.9	3.6 1.6/5.9	3.2 1.6/5.2	2.7 1.0/4.4	1.8 0.8/2.7	1.2 0.5/2.2	0.6 0.2/1.6	2.7 2.1/3.1
Tilt-Latitude	Average 1.1 Min/Max 0.3/2.1	2.1 0.5/5.2	3.4 1.2/5.6	4.5 2.3/7.6	4.5 2.1/6.9	4.0 2.3/6.4	3.9 1.8/6.4	3.3 1.6/5.3	2.7 1.0/4.4	1.8 0.8/2.8	1.3 0.5/2.3	0.7 0.2/1.8	2.8 2.2/3.3

**Average Climatic Conditions**

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-12.3	-9.6	-5.8	0.5	7.2	12.5	14.7	12.8	7.8	-0.4	-8.6	-11.5	0.6
Daily Minimum Temp	-17.4	-15.6	-12.3	-5.3	1.0	6.9	9.4	7.6	2.6	4.9	-13.4	-16.2	-4.8
Daily Maximum Temp	-7.1	-3.7	0.8	6.3	13.3	18.0	19.8	18.1	13.1	4.1	-3.8	-6.8	6.0
Record Minimum Temp	-44.4	-43.3	-41.7	-38.3	-20.6	-2.2	0.6	-3.9	-9.4	-29.4	-40.6	-42.8	-44.4
Record Maximum Temp	7.2	10.6	11.7	20.6	27.8	32.8	32.2	29.4	25.6	20.0	10.0	8.3	32.8
HDD, Base 18.3°C	949	782	747	535	344	175	114	171	315	582	808	925	6448
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	72	72	69	68	66	70	75	81	82	81	76	75	74
Wind Speed (mi/s)	2.9	2.7	2.7	2.5	2.5	2.6	2.4	2.0	1.9	2.1	2.7	2.8	2.5

**Yakutat, AK****WBAN NO. 25339**

LATITUDE: 59.52° N  
LONGITUDE: 139.67° W  
ELEVATION: 9 meters  
MEAN PRESSURE: 1009 millibars  
STATION TYPE: Secondary

**Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±9%**

Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.4 0.2/0.5	1.0 0.7/1.4	2.2 1.6/2.8	3.5 2.6/4.7	4.1 3.5/4.9	4.4 3.3/5.1	4.2 3.6/5.3	3.4 2.7/4.1	2.2 1.7/3.0	1.1 0.9/1.3	0.5 0.4/0.7	0.3 0.2/0.5
Latitude -15	Average Min/Max	1.0 0.3/1.7	1.9 1.1/3.5	3.2 2.0/4.9	4.2 2.9/6.1	4.2 3.4/5.4	4.2 3.0/5.0	4.1 3.5/5.5	3.7 2.8/4.7	2.8 2.0/4.4	1.7 1.2/2.4	1.2 0.6/2.2	0.7 0.3/1.5
Latitude	Average Min/Max	1.2 0.3/1.9	2.1 1.1/3.9	3.3 2.0/5.1	4.2 2.7/6.1	3.9 3.1/5.2	3.8 2.7/4.6	3.7 3.1/5.1	3.5 2.5/4.4	2.7 1.9/4.4	1.8 1.2/2.5	1.3 0.6/2.4	0.8 0.3/1.7
Latitude +15	Average Min/Max	1.2 0.3/2.0	2.1 1.1/4.1	3.3 1.9/5.1	3.9 2.5/5.8	3.5 2.7/4.8	3.3 2.3/3.9	3.2 2.7/4.4	3.1 2.3/4.0	2.5 1.7/4.1	1.7 1.1/2.5	1.3 0.6/2.6	0.8 0.3/1.9
90	Average Min/Max	1.2 0.3/2.1	2.0 1.0/4.0	3.1 1.8/4.8	3.5 2.1/5.2	2.8 2.3/4.2	2.6 1.9/3.1	2.6 2.3/3.5	2.2 1.9/3.3	2.2 1.5/3.7	1.6 1.0/2.4	1.3 0.5/2.5	0.8 0.3/1.9

**Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±9%**

Axis Tilt (°)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average Min/Max	0.6 0.2/1.0	1.5 0.9/2.8	3.2 2.1/4.8	4.9 3.3/7.5	5.3 4.1/6.7	5.3 3.6/6.7	5.0 3.9/7.4	4.3 3.1/5.8	2.9 1.9/4.8	1.5 1.0/2.1	0.8 0.4/1.5	0.4 0.2/0.8
Latitude -15	Average Min/Max	1.1 0.3/1.9	2.2 1.1/4.3	4.0 2.4/6.3	5.5 3.6/8.6	5.5 4.2/7.2	5.4 3.5/6.9	5.2 3.9/7.9	4.7 3.3/6.4	3.4 2.1/5.9	2.0 1.3/2.9	1.3 0.5/2.5	0.8 0.3/1.6
Latitude	Average Min/Max	1.2 0.3/2.1	2.3 1.2/4.6	4.0 2.5/6.5	5.5 3.5/8.6	5.3 4.0/6.9	5.1 3.3/6.6	4.9 3.6/7.6	4.5 3.2/6.2	3.4 2.0/5.9	2.0 1.3/3.0	1.4 0.6/2.8	0.8 0.3/1.9
Latitude +15	Average Min/Max	1.3 0.3/2.2	2.4 1.2/4.7	4.0 2.4/6.5	5.3 3.3/8.4	5.0 3.7/6.7	4.8 3.1/6.2	4.6 3.3/7.2	4.3 2.9/5.9	3.2 1.9/5.7	2.0 1.3/3.0	1.4 0.6/2.9	0.9 0.3/2.0

**Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±9%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average Min/Max	1.3 0.3/2.2	2.4 1.2/4.7	4.1 2.5/6.5	5.6 3.6/8.6	5.7 4.3/7.3	5.6 3.7/7.2	5.3 4.0/8.1	4.7 3.3/6.4	3.4 2.1/5.9	2.0 1.3/3.0	1.4 0.6/2.9	0.9 0.3/2.0

**Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±8%**

Tracker	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W	Average Min/Max	0.7 0.1/1.5	1.1 0.2/3.0	1.6 0.8/3.2	2.0 1.0/3.7	2.0 1.0/3.2	1.9 0.7/2.9	1.8 0.7/3.8	1.7 0.7/2.8	1.3 0.4/3.2	0.9 0.3/1.7	0.8 0.1/1.9	0.5 0.1/1.4
Horiz Axis	Average Min/Max	0.3 0.1/0.6	0.7 0.2/1.9	1.5 0.7/3.0	2.5 1.3/4.7	2.6 1.3/4.0	2.4 0.9/3.7	2.3 0.9/4.8	2.1 0.8/3.5	1.4 0.4/3.5	0.7 0.3/1.3	0.4 0.1/1.0	0.2 0.0/0.5
1-Axis, N-S	Average Min/Max	0.7 0.1/1.5	1.3 0.3/3.5	2.2 1.1/4.2	2.9 1.5/5.4	2.8 1.4/4.4	2.4 0.9/3.8	2.3 0.9/5.0	2.4 0.9/4.0	1.9 0.5/4.5	1.1 0.4/2.1	0.8 0.1/2.1	0.5 0.1/1.4
Tilt=Latitude	Average Min/Max	0.8 0.1/1.6	1.3 0.3/3.6	2.2 1.1/4.2	3.0 1.5/5.5	2.9 1.5/4.6	2.6 1.0/4.1	2.5 1.0/5.3	2.5 0.9/4.1	1.9 0.5/4.5	1.1 0.4/2.2	0.9 0.2/2.2	0.5 0.1/1.5

**Average Climatic Conditions**

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-3.8	-2.2	-0.6	2.4	6.3	9.7	12.0	11.8	9.0	4.9	-0.4	-2.7	3.9
Daily Minimum Temp	-7.4	-6.1	-4.6	-1.6	2.5	6.3	8.8	8.1	5.0	1.5	-3.8	-6.1	0.2
Daily Maximum Temp	-0.3	1.7	3.4	6.4	10.0	13.1	15.2	15.4	12.9	8.4	2.9	0.6	7.5
Record Minimum Temp	-30.0	-28.9	-28.9	-16.1	-6.1	-1.7	1.7	-1.7	-6.1	-14.4	-21.1	-31.1	-31.1
Record Maximum Temp	12.8	12.2	15.0	20.0	26.1	27.8	28.9	30.0	25.0	17.2	12.8	11.1	30.0
HDD, Base 18.3°C	687	576	586	478	374	260	196	203	280	415	562	653	5269
CDD, Base 18.3°C	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative Humidity (%)	83	83	81	81	83	84	88	88	89	88	85	84	85
Wind Speed (m/s)	3.2	3.1	3.0	3.0	3.2	3.1	2.9	2.8	3.0	3.4	3.1	3.2	3.1